Section 1 - Product and Company Information

Product Name: ETHER, ANHYDROUS, 99.8%
Product Number: 296082
Brand: Aldrich Chemical
Company: Sigma-Aldrich
Street Address: 3050 Spruce Street
City, State, Zip, Country: St. Louis, MO 63103 US
Technical Phone: 314 771 5765
Fax: 800 325 5052

Emergency Phone: 414 273 3850 Ext.5996

Section 2 - Composition/Information on Ingredient

Substance Name: DIETHYL ETHER
CAS #: 60-23-7
Formula: C4H10O
Synonyms: Aether, Anaesthetic ether, Anesthesia ether, Anesthetic ether, Diaethylaether (German), Diethyl ether (DOT:OSHA), Diethylether (French), Ether (DOT:OSHA), Ether (ehylechyle (French), Ethoxyethane, Ethyl ether (ACGIH:OSHA), Oxyde d’ethyle (French), RCRA waste number U117, Solvent ether

Section 3 - Hazards Identification

Emergency Overview:
Flammable (USA) Extremely Flammable (EU). Harmful. Harmful if swallowed. Irritating to eyes, respiratory system, and skin. May form explosive peroxides. Target organ(s): Central nervous system. Kidneys.

HMIS Rating:
Health: 1
Flammability: 4
Reactivity: 3

NFPA Ratings:
Health: 1
Flammability: 4
Reactivity: 3

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure:
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

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 contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure:
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.
Section 5 - Fire Fighting Measures

**Explosion Hazards**
Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

- **Flash Point:** -104 °F \(\sim -40 °C\)
- **Explosion Limits:**
  - Lower: 1.8 %
  - Upper: 48 %
- **Autoignition Temp:** 160 °C
- **Flammability:** N/A

**Extinguishing Media**

- **Suitable**
  - Carbon dioxide, dry chemical powder, or appropriate foam.

**Firefighting**

- **Protective Equipment**
  - Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

- **Specific Hazard(s)**
  - Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

**Procedure to be Followed in Case of Leak or Spill**
Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

**Procedure(s) of Personal Precaution(s)**
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

**Methods for Cleaning Up**
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

**Handling**

- **User Exposure**
  - Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

**Storage**

- **Suitable**
  - Keep tightly closed. Keep away from heat, sparks, and open flame. Refrigerate.

Section 8 - Exposure Controls / PPE

**Engineering Controls**
Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

**Personal Protective Equipment**

- **Respiratory**
  - NIOSH/MSHA-approved respirator.
- **Hand**
  - Compatible chemical-resistant gloves.
- **Eye**
  - Chemical safety goggles.
General Hygiene Measures
Remove and wash contaminated clothing promptly. Wash thoroughly after handling.

Exposure Limits, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>STEL</td>
<td>1520 MG/M3 (500 PPM)</td>
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</tr>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>1210 MG/M3 (400 PPM)</td>
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<tr>
<td>USA</td>
<td>MSHA Standard-air</td>
<td>TWA</td>
<td>400 PPM (1200 MG/M3)</td>
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<tr>
<td>USA</td>
<td>OSHA.</td>
<td>PEL</td>
<td>8H TWA 400 PPM (1200 MG/M3)</td>
<td>check ACGIH TLV</td>
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Section 9 - Physical/Chemical Properties

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<th>Appearance</th>
<th>Physical State</th>
<th>Color</th>
<th>Molecular Weight: 74.12 AMU</th>
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</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>N/A</td>
<td>760 mmHg</td>
</tr>
<tr>
<td>BP/BP Range</td>
<td>34.6 °C</td>
<td>760 mmHg</td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>-116 °C</td>
<td>760 mmHg</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
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<tr>
<td>Vapor Pressure</td>
<td>442.552 mmHg</td>
<td>20 °C</td>
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<td>Vapor Density</td>
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<tr>
<td>Saturated Vapor Conc.</td>
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</tr>
<tr>
<td>SG/Density</td>
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</tr>
<tr>
<td>Bulk Density</td>
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<tr>
<td>Odor Threshold</td>
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<tr>
<td>Volatile %</td>
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<td></td>
</tr>
<tr>
<td>VOC Content</td>
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<td></td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Solvent Content</td>
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<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
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<td></td>
</tr>
<tr>
<td>Viscosity</td>
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<td></td>
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<tr>
<td>Partition Coefficient</td>
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<tr>
<td>Decomposition Temp.</td>
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<td>Flash Point °F</td>
<td>-104 °F</td>
<td></td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>-40 °C</td>
<td></td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>Lower: 1.8 %</td>
<td></td>
</tr>
<tr>
<td>Autoignition Temp</td>
<td>160 °C</td>
<td>Upper: 48 %</td>
</tr>
<tr>
<td>Refractive Index</td>
<td>1.353</td>
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<tr>
<td>Solubility</td>
<td>N/A</td>
<td></td>
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</tbody>
</table>

Section 10 - Stability and Reactivity

Stability
Conditions of Instability
May form peroxides of unknown stability.

Conditions to Avoid
Sensitive to light. Sensitive to air. Sensitive to heat.

Materials to Avoid
Oxidizing agents, Strong acids.

Hazardous Decomposition Products
Hazardous Decomposition Products
Carbon monoxide, Carbon dioxide.

Hazardous Polymerization
Section 11 - Toxicological Information

Route of Exposure

Skin Contact
Causes skin irritation.

Skin Absorption
May be harmful if absorbed through the skin.

Eye Contact
Causes eye irritation.

Inhalation
May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion
Harmful if swallowed.

Target Organ(s) or System(s)

Signs and Symptoms of Exposure
Contact with eyes can cause redness, tearing, and blurred vision. Prolonged or repeated contact with skin can cause defatting and dermatitis. Exposure can cause: Coughing, chest pains, difficulty in breathing.

RTECS Number: KI5775000

Toxicity Data

Oral - Man: 260 mg/kg (LDLO)
Oral - Rat: 1,215 mg/kg (LD50)
Inhalation - Mouse: 31,000 ppm (LC50)
   Remarks: Behavioral: Convulsions or effect on seizure threshold.
Intraperitoneal - Mouse: 2420 MG/KG (LD50)
Intravenous - Mouse: 996 MG/KG (LD50)
Skin - Rabbit: >20 ML/KG (LD50)

Irritation Data

Eyes - Human: 100 ppm
Skin - Rabbit: 360 mg
   Remarks: Open irritation test
Eyes - Rabbit: 100 mg
   Remarks: Moderate irritation effect
Skin - Guinea pig: 50 mg 24H
   Remarks: Severe irritation effect

Chronic Exposure - Mutagen

<table>
<thead>
<tr>
<th>Species</th>
<th>Dose</th>
<th>Cell Type</th>
<th>Mutation test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse</td>
<td>2850 MG/L</td>
<td>Embryo</td>
<td>DNA inhibition</td>
</tr>
<tr>
<td>Hamster</td>
<td>1 PPH</td>
<td>fibroblast</td>
<td>Other mutation test systems</td>
</tr>
</tbody>
</table>

Chronic Exposure - Reproductive Hazard

Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.
Section 12 - Ecological Information

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.
Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Diethyl ether [or] Ethyl ether
UN#: 1155
Class: 3
Packing Group: Packing Group I
PIH: Not PIH

IATA
Proper Shipping Name: ETHYL ETHER
IATA Number: 1155
Hazard Class: 3
Packing Group: I

Section 15 - Regulatory Information

EU Directives Classification
Symbol of Danger: F+
Indication of Danger
Extremely Flammable.
Risk Statements
R: 12 19
Extremely flammable. May form explosive peroxides.
Safety Statements
S: 9 16 29 33
Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. Do not empty into drains. Take precautionary measures against static discharges.

US Classification and Label Text
Indication of Danger
Flammable (USA) Extremely Flammable (EU). Harmful.
Risk Statements
Harmful if swallowed. Irritating to eyes, respiratory system, and skin. May form explosive peroxides.
Safety Statements
Keep away from sources of ignition - no smoking. Keep container tightly closed in a cool well-ventilated place. Do not empty into drains. Take precautionary measures against static discharges. Wear suitable gloves and eye/face protection.
US Statements
Target organ(s): Central nervous system. Kidneys.
Handling and Storage
Refrigerate.

United States Regulatory Information
SARA 313 Listed: No

TSCA Inventory Item: Yes

Section 16 - Other Information

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. 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
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