Section 1 - Product and Company Information

Product Name ETHANOL, REAGENT, ANHYDROUS, DENATURED
Product Number 277649
Brand ALDRICH
Company Sigma-Aldrich
Street Address 3050 Spruce Street
City, State, Zip, Country SAINT LOUIS MO 63103 US
Technical Phone: 314 771 5765
Emergency Phone: 414 273 3850 Ext. 5996
Fax: 800 325 5052

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>Percent</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETHANOL, DENATURED 5%MEOH, 5% IPA</td>
<td>None</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>ETHYL ALCOHOL, NON-DENATURED, 200 PROOF</td>
<td>64-17-5</td>
<td>90</td>
<td>No</td>
</tr>
<tr>
<td>METHANOL</td>
<td>67-56-1</td>
<td>5</td>
<td>Yes</td>
</tr>
<tr>
<td>2-PROPANOL</td>
<td>67-63-0</td>
<td>5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Formula C2H6O

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Flammable (USA) Highly Flammable (EU). Toxic (USA) Harmful (EU).
Harmful by inhalation, in contact with skin and if swallowed.
Irritating to eyes, respiratory system and skin. Harmful: possible risk of irreversible effects through inhalation, in contact with skin, and if swallowed.
Target organ(s): Eyes. Nerves.

HMIS RATING
HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 1

NFPA RATING
HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 1

*additional chronic hazards present.

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 immediately.

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 skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS
Flammable Hazards: Yes

EXPLOSION HAZARDS
Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions. Forms explosive mixtures in air.

FLASH POINT
48°F  9°C  Method: closed cup

EXPLOSION LIMITS
Lower: 3.3 %  Upper: 24.5 %

AUTOIGNITION TEMP
362°C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. 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): Emits toxic fumes under fire conditions. Flammable liquid.
Specific Method(s) of Fire Fighting: Use water spray to cool fire-exposed containers.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition.

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. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not use if skin is cut or scratched. Wash thoroughly after handling.

STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

SPECIAL REQUIREMENTS

Handle and store under inert gas. Moisture sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Remove and wash contaminated clothing promptly.

Section 9 - Physical/Chemical Properties

Appearance: Physical State: Liquid

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>46.07 AMU</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>BP/BP Range</td>
<td>78 °C</td>
<td>760 mmHg</td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>-130 °C</td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>44.6 mmHg</td>
<td>20 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>1.59 g/l</td>
<td></td>
</tr>
<tr>
<td>Saturated Vapor Conc.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SG/Density</td>
<td>0.785 g/cm3</td>
<td></td>
</tr>
<tr>
<td>Bulk Density</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Volatile%</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>VOC Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Solvent Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Surface Tension</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Decomposition Temp.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Flash Point</td>
<td>48 °F 9 °C</td>
<td>Method: closed cup</td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>Lower: 3.3 %</td>
<td></td>
</tr>
</tbody>
</table>
Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions to Avoid: Protect from moisture.
Materials to Avoid: Oxidizing agents, Peroxides, Acids, Acid chlorides, Acid anhydrides, Alkali metals, Ammonia.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: Harmful if absorbed through skin.
Eye Contact: Causes eye irritation.
Inhalation: 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
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Can cause CNS depression. Exposure can cause: Gastrointestinal disturbances. Nausea, dizziness, and headache. Narcotic effect. May cause convulsions.

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Section 12 - Ecological Information

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. 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: Ethanol [or] Ethyl alcohol [or]
Ethanol solutions [or] Ethyl alcohol solutions
UN#: 1170
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Flammable liquid, toxic, n.o.s.
IATA UN Number: 1992
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: F Xn
R: 11 20/21/22 36/37/38 68/20/21/22
Risk Statements: Highly flammable. Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin. Harmful: possible risk of irreversible effects through inhalation, in contact with skin, and if swallowed.
S: 7 16 24/25 26 36/37/39 45
Safety Statements: Keep container tightly closed. Keep away from sources of ignition - no smoking. Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT
Risk Statements: Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin. Harmful: possible risk of irreversible effects through inhalation, in contact with skin, and if swallowed.
Safety Statements: Keep container tightly closed. Keep away from sources of ignition - no smoking. Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
NOTES: This product is or contains a component that is subject to SARA313 reporting requirements.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
Section 16 - Other Information

DISCLAIMER
  For R&D use only. Not for drug, household or other uses.

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. 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 Inc.,
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