Material Safety Data Sheet

Section 1 - Product and Company Information

Product Name: ACETIC ACID, GLACIAL, 98.99 +%
Product Number: 334826
Brand: Sigma-Aldrich
Company: Sigma-Aldrich
Street Address: 3300 Spouse Street
City, State, Zip, Country: SAINT LOUIS, MO 63103 US
Technical Phone: 314 771 5765
Fax: 800 283 5050
Emergency Phone: 414 273 3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACETIC ACID</td>
<td>64-19-7</td>
<td>No</td>
</tr>
</tbody>
</table>

Formula: C2H4O2
Synonyms: Acetic acid (AOCHI-OSHA), Acetic acid, glacial, Acide acétique (French), Acido acético (Italian), Azijnzuur (Dutch), Essigsaure (German), Ethenacetic acid, Ethyl acetic acid, Glacial acetic acid, Pyeletin acetique (Czech), Methanecarboxylic acid, Octowy kwas (Polish), Vinegar acid

Section 3 - Hazards Identification

Emergency Overview:
Non flammable (USA). Flammable (EU). Corrosive.
Causes severe burns. Harmful in contact with skin.

HMS Rating:
Health: 5
Flammability: 2
Reactivity: 0

NFPA Rating:
Health: 3
Flammability: 2
Reactivity: 0

Additional Chronic Hazards Present:

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

Section 4 - First Aid Measures

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

Flash Point: 104 °F (40 °C)
Explosion Limits: Lower: 4 % Upper: 19.9 %
Autoignition Temp: 427 °C

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 Hazards: Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill:
Evacuate area.

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

Methods for Cleaning Up:
Cover with dry time or soda ash, pick up, keep in a closed container, and hold for disposal. 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, or clothing. Avoid prolonged or repeated exposure.

Storage:
Suitable: Keep tightly closed. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

Engineering Controls:
Safety shower and eye bath. Use only in a chemical fume hood.

Personal Protective Equipment:
Respiratory:
Government approved respirator.
Hand:
Chemically resistant gloves.
Eye:
Chemical safety goggles.
Other:
Face shield (8-inch minimum).
Section 1 - Product and Company Information

Product Name: ACETIC ACID, GLACIAL, 99.98+%  
Brand: Aldrich Chemical

Company: Sigma-Aldrich  
Street Address: 3060 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

Substance Name: ACETIC ACID  
CAS #: 64-19-7  
SARA 313: No

Formula: C2H4O2  
Synonyms: Acetic acid (AGI/OSHA), Acetic acid, glacial, Acide acétique (French), Acido acetico (Italian), Essigsäure (German), Emanoide acid, Ethylc acid, Glacial acetic acid, Kyselina octova (Czech), Methano-carboxylic acid, Octoylox acid (Polish), Vinegar acid

Section 3 - Hazards Identification

Emergency Overview: Combustible (USA) Flammable (EU), Corrosive. Causes severe burns. Harmful in contact with skin. Lachrymator. Target organ(s): Eyes, skin, kidneys.

HMIS Rating:  
Health: 3  
Flammability: 2  
Reactivity: 0

NFPA Rating:  
Health: 3  
Flammability: 2  
Reactivity: 0

*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. Do not induce vomiting.

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.

Section 5 - Fire Fighting Measures

Flash Point: 104 °F  
Explosion Limits: Lower: 4 %  
Upper: 19.9 %

Autoignition Temp: 427 °C

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: Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill: Evacuate area.

Procedures of Personal Protection:  
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up:  
Cover with dry lime or soda ash, pick up, keep in a closed container, and hold for waste disposal. 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. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

Engineering Controls: Safety shower and eye bath. Use only in a chemical fume hood.

Personal Protective Equipment:  
Respiratory: Government approved respirator.  
Hand: Compatible chemical-resistant gloves.  
Eye: Chemical safety goggles.  
Other: Faceshield (8-inch minimum).
Blood: Other changes.

Intravenous: Mouse: 525 MG/KG (LD50)
Remarks: Behavioral Convulsions or effect on seizure threshold.

Skin: Rabbit: 1060 UI/KG (LD50)

Irritation Data
Skin: Human: 50 mg 24H
Remarks: Mild irritation effect
Skin: Rabbit: 525 mg
Remarks: Open irritation test
Skin: Rabbit: 50 mg 24H
Remarks: Mild irritation effect
Eyes: Rabbit: 5 mg 30S
Remarks: Irrised

Chronic Exposure - Mutagen

<table>
<thead>
<tr>
<th>Species</th>
<th>Route</th>
<th>Mutagen</th>
<th>Cell Type</th>
<th>Mutation Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
<td></td>
<td></td>
<td>lymphocyte</td>
<td>Sister chromatid exchange</td>
</tr>
<tr>
<td>Mouse</td>
<td></td>
<td></td>
<td>Skin</td>
<td>Unscheduled DNA synthesis</td>
</tr>
<tr>
<td>Mouse</td>
<td></td>
<td></td>
<td>Skin</td>
<td>Other mutation test systems</td>
</tr>
<tr>
<td>Hamster</td>
<td></td>
<td></td>
<td>ovary</td>
<td>Cyto genetic analysis</td>
</tr>
</tbody>
</table>

Chronic Exposure - Reproductive Hazard

<table>
<thead>
<tr>
<th>Species</th>
<th>Route of Application</th>
<th>Exposure Time</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rat</td>
<td>700 MG/KG Oral</td>
<td>(180 POST)</td>
<td>Effects on Neurotoxic, behavioral, effects on fertility, male fertility index (e.g., if males impregnating females per if males exposed to fertile nonpregnant females).</td>
</tr>
</tbody>
</table>

Section 12 - Ecological Information

Acute Ecotoxicity Tests

**Test Type**: EC50 Algae
**Time**: 24.0 h
**Value**: 156 mg/l

**Test Type**: EC50 Daphnia
**Species**: Daphnia magna
**Time**: 48.0 h
**Value**: 65 mg/l

**Test Type**: LC50 Fish
**Species**: Leuciscus idus
**Time**: 48.0 h
**Value**: 410 mg/l

**Test Type**: LC50 Fish
**Species**: Cyprinus carpio
**Time**: 48.0 h
**Value**: 49 mg/l

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
- Proper Shipping Name: Acetic acid, glacial [or] Acetic acid solution, [with more than 80 percent acid, by mass]
- UN: 2769
- Class: 3
- Packing Group: Packing Group II
- Hazard Label: Corrosive
- Hazard Label: Flammable liquid
- PIH: Not PIH
- IATA
- Proper Shipping Name: Acetic acid, glacial
- IATA UN Number: 2769
- Hazard Class: 3
- Packing Group: II

Section 15 - Regulatory Information

EU Directives Classification
- Symbol of Danger: C
- Indication of Danger: Corrosive
- Risk Statements: R: 10 35
- Flammable. Causes severe burns.
- Safety Statements: S: 29 45
- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accidental contact with water, seek medical advice immediately (show the label when possible).

US Classification and Label Text
- Indication of Danger: Corrosive
- Risk Statements: Causes severe burns. Harmful to environmental contact with skin.
- Safety Statements: Keep away from sources of ignition - no smoking. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible).
- US Statements: Lachrymator. Target organ(s): Eyes, skin, respiratory system.

United States Regulatory Information
- SARA Listed: No
- TSCA Inventory Item: Yes

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.
- DSL: Yes
- NDSL: No

Aldrich Chemical - 338826
Page 5
Sigma-Aldrich Corporation
www.sigma-aldrich.com
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. 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 invoice or packing slip for additional terms and conditions of sale. Copyright 2003 Sigma-Aldrich Co. Licence granted to make unlimited paper copies for internal use only.