1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Acetic acid, ≥99%
Product Number: A6283
Brand: Sigma-Aldrich
Supplier: Sigma-Aldrich
Telephone: +1 800-325-5832
Fax: +1 800-325-5052
Emergency Phone #: (314) 776-6555
Preparation Information: Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid, Target Organ Effect, Harmful by skin absorption., Skin sensitiser, Corrosive

Target Organs
Teeth., Kidney

GHS Classification
Flammable liquids (Category 3)
Acute toxicity, Oral (Category 5)
Acute toxicity, Inhalation (Category 3)
Acute toxicity, Dermal (Category 4)
Skin corrosion (Category 1A)
Serious eye damage (Category 1)
Skin sensitization (Category 1)
Acute aquatic toxicity (Category 3)

GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H303 May be harmful if swallowed.
H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H331 Toxic if inhaled.
H402 Harmful to aquatic life.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/ physician.

HMIS Classification
Health hazard: 3
Chronic Health Hazard: *
Flammability: 2
Physical hazards: 0

NFPA Rating
Health hazard: 3
Fire: 2
Reactivity Hazard: 0

Potential Health Effects
Inhalation May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin Causes skin burns.
Eyes Causes eye burns. Causes severe eye burns.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: Glacial acetic acid
Formula: C₂H₄O₂
Molecular Weight: 60.05 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid</td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>64-19-7</td>
</tr>
<tr>
<td>EC-No.</td>
<td>200-580-7</td>
</tr>
<tr>
<td>Index-No.</td>
<td>607-002-00-6</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
Take off contaminated clothing and shoes immediately. 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. FIREFIGHTING MEASURES

Conditions of flammability
Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Further information
Use water spray to cool unopened containers.

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).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
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.
Moisture sensitive.

8. EXPOSURE CONTROLS/PERSONAL 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>
<tbody>
<tr>
<td>Acetic acid</td>
<td>64-19-7</td>
<td>TWA</td>
<td>10 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Remarks
Eye & Upper Respiratory Tract irritation Pulmonary function

| STEL | 15 ppm | USA. ACGIH Threshold Limit Values (TLV) |

Eye & Upper Respiratory Tract irritation Pulmonary function

| TWA | 10 ppm | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
|     |        | The value in mg/m3 is approximate. |

| TWA | 10 ppm | 25 mg/m3 | USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000 |
| TWA | 10 ppm | 25 mg/m3 | USA: NIOSH Recommended Exposure Limits |
| ST  | 15 ppm | 37 mg/m3 | USA: NIOSH Recommended Exposure Limits |
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.

Immersion protection
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: > 480 min
Material tested:Butoject® (Aldrich Z677647, Size M)

Splash protection
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: > 30 min
Material tested:Lapren® (Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, 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 CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist 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.

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

<table>
<thead>
<tr>
<th>Appearance</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Form</td>
<td>liquid</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>2.4 at 60.05 g/l</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>Melting point/range: 16.2 °C (61.2 °F) - lit.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>117 - 118 °C (243 - 244 °F) - lit.</td>
</tr>
<tr>
<td>Flash point</td>
<td>40.0 °C (104.0 °F) - closed cup</td>
</tr>
<tr>
<td>Ignition temperature</td>
<td>485 °C (905 °F)</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>485.0 °C (905.0 °F)</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>4 % (V)</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>19.9 % (V)</td>
</tr>
</tbody>
</table>
Vapour pressure
73.3 hPa (55.0 mmHg) at 50.0 °C (122.0 °F)
15.2 hPa (11.4 mmHg) at 20.0 °C (68.0 °F)

Density
1.049 g/cm³ at 25 °C (77 °F)

Water solubility
completely miscible

Partition coefficient:
n-octanol/water
log Pow: -0.17

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
no data available

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Oxidizing agents, Soluble carbonates and phosphates, Hydroxides, Metals, Peroxides, permanganates, e.g. potassium permanganate, Amines, Alcohols

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD₅₀
LD50 Oral - rat - 3,310 mg/kg

Inhalation LC₅₀
LC50 Inhalation - mouse - 1 h - 5620 ppm

LC50 Inhalation - rat - 4 h - 11.4 mg/l

Dermal LD₅₀
LD50 Dermal - rabbit - 1,112 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
Eyes - rabbit - Corrosive to eyes

Respiratory or skin sensitization
May cause sensitization by skin contact.

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

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.

- **Ingestion**
  May be harmful if swallowed.

- **Skin**
  Causes skin burns.

- **Eyes**
  Causes eye burns. Causes severe eye burns.

**Signs and Symptoms of Exposure**

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Ingestion or inhalation of concentrated acetic acid causes damage to tissues of the respiratory and digestive tracts. Symptoms include: hematemesis, bloody diarrhea, edema and/or perforation of the esophagus and pylorus, pancreatitis, hematuria, anuria, uremia, albuminuria, hemolysis, convulsions, bronchitis, pulmonary edema, pneumonia, cardiovascular collapse, shock, and death. Direct contact or exposure to high concentrations of vapor with skin or eyes can cause: erythema, blisters, tissue destruction with slow healing, skin blackening, hyperkeratosis, fissures, corneal erosion, opacification, iritis, conjunctivitis, and possible blindness., 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: AF1225000

**12. ECOLOGICAL INFORMATION**

**Toxicity**

- **Toxicity to fish**
  semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 1,000 mg/l - 96 h
  Method: OECD Test Guideline 203

- **Toxicity to daphnia and other aquatic invertebrates**
  EC50 - Daphnia magna (Water flea) - > 300.82 mg/l - 48 h
  Method: OECD Test Guideline 202

**Persistence and degradability**
Biodegradability:

**aerobic**

Result: 99% - Readily biodegradable.

Remarks: Expected to be biodegradable

Bioaccumulative potential:

no data available

Mobility in soil:

no data available

PBT and vPvB assessment:

no data available

Other adverse effects:

**Biochemical Oxygen Demand (BOD)**

880 mg/g

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic life.

Additional ecological information:

no data available

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: 2789  Class: 8 (3)  Packing group: II

Proper shipping name: Acetic acid, glacial

Reportable Quantity (RQ): 5000 lbs

Marine pollutant: No

Poison Inhalation Hazard: No

**IMDG**

UN number: 2789  Class: 8 (3)  Packing group: II

Proper shipping name: ACETIC ACID, GLACIAL

Marine pollutant: No

EMS-No: F-E, S-C

**IATA**

UN number: 2789  Class: 8 (3)  Packing group: II

Proper shipping name: Acetic acid, glacial

15. REGULATORY INFORMATION

**OSHA Hazards**

Combustible Liquid, Target Organ Effect, Harmful by skin absorption., Skin sensitiser, Corrosive

**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**

SARA 313: 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, Acute Health Hazard, Chronic Health Hazard
Massachusetts Right To Know Components

<table>
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Pennsylvania Right To Know Components

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New Jersey Right To Know Components

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California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information
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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.