MATERIAL SAFETY DATA SHEET

Pyruvic acid

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier
Pyruvic acid

Chemical name
2-oxopropanoic acid; α -ketopropionic acid; acetylformic acid

Company name
Jinan Jiuan Ester Chemical Co., Ltd.

Address
Chemical Industrial Park, Zhangqiu City, Shandong Province, China

Telephone
0086-531-82687186

Website
www.pengbobio.com

E-mail
sales@pengbobio.com

SECTION 2. HAZARDS IDENTIFICATION

Physical hazards
Flammable liquids Category 4

Health hazards
Skin corrosion/irritation Health Category 1B
Serious eye damage/eye irritation Category 1

OSHA hazard(s)
Not classified.

Label elements
Hazard symbol
Danger.

Signal word
Combustible liquid. Causes severe skin burns and eye damage. Causes serious eye damage.

Hazard statement

Precautionary statement

Prevention
Keep away from flames and hot surfaces-No smoking. Do not breathe mist or vapor. Wash thoroughly after handling. Wear protective gloves/eye protection/face protection

Immediately call a poison center/doctor. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. In case of fire: Use appropriate media to extinguish.

Response

Storage
Store in a well-ventilated place. Keep cool. Store locked up.
Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise
Not classified.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
Pyruvic acid

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Molecular formula</th>
<th>M.W.</th>
<th>EINECS No.</th>
<th>CAS No.</th>
<th>Weight percent</th>
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<tbody>
<tr>
<td>Pyruvic acid</td>
<td>C₃H₄O₃</td>
<td>88.06</td>
<td>204-824-3</td>
<td>127-17-3</td>
<td>98-100</td>
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</table>

SECTION 4. FIRST AID MEASURES

Inhalation
If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

Skin contact
Rinse skin with water/shower. Get medical attention if irritation develops and persists.

Eye contact
Rinse with water. Get medical attention if irritation develops and persists.

Ingestion
Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.

Most important symptoms/effects, acute and delayed
Gastrointestinal disturbances.

Indication of immediate medical attention and special treatment needed
Treat symptomatically.

General information
Remove from exposure. Remove contaminated clothing. For treatment advice, seek guidance from an occupational health physician or other licensed health-care provider familiar with workplace chemical exposures. In the United States, the national poison control center phone number is 1-800-222-1222. If person is not breathing, give artificial respiration. If breathing is difficult, give oxygen if available. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical
By heating and fire, harmful vapors/gases may be formed.

Special protective equipment and precautions for firefighters
Use protective equipment appropriate for surrounding materials.

Fire-fighting equipment/instructions
As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing. Use water spray to cool unopened containers.
Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unnecessary personnel away. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Avoid inhalation of vapors. Wear appropriate personal protective equipment.

Methods and materials for containment and cleaning up

Remove sources of ignition. Absorb spillage with suitable absorbent material. For waste disposal, see section 13 of the SDS. Clean surface thoroughly to remove residual contamination. Keep combustibles (wood, paper, oil, etc.) away from spilled material.

SECTION 7. HANDLING AND STORAGE

Technical measures:

Handle preventing formation of airborne dust. Wearing protective equipment such as dust mask and protective glasses is recommended because this substance may cause some irritation by inhalation. Cautions of the deteriorations to depend on light, heat, moisture, etc..

Precautions for safe handling

Handle it under local exhaust ventilation or in the place with a whole exhaust ventilation system.

Conditions for safe storage, including any incompatibilities

Store in a cool and dark place avoiding high temperature

Packing:

Storing in a plastic container or bag, etc and sealing.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls:

Handle with caution not to cause dust especially in a room. Use local exhaust ventilation depending on the situation. It is preferable to install a hand and eye washer near the handling place and show its place clearly.

Appropriate engineering controls

Airborne exposure should be controlled primarily by engineering controls such as general dilution ventilation, local exhaust ventilation, or process enclosure. Local exhaust ventilation is generally preferred to general exhaust because it can control the contaminant at its source, preventing dispersion into the work area. An industrial hygiene survey involving air monitoring may be used to determine the effectiveness of engineering controls. Local exhaust ventilation such as a laboratory fume hood or other vented enclosure is recommended, particularly for grinding, crushing, weighing, or other dust-generating procedures. Effectiveness of engineering controls intended for use with highly potent materials should be assessed by use of nontoxic surrogate materials. Local exhaust ventilation such as a laboratory fume hood or other vented enclosure is recommended, particularly for aerosol-generating procedures.

Respiratory protection

Where respirators are deemed necessary to reduce or control occupational exposures, use NIOSH-approved respiratory protection and have an effective respirator program in place.

Eye/face protection

Safety glasses with side-shields.

Hand protection

Protective gloves.

Skin and body protection

Wear suitable protective clothing, gloves and eye/face protection.
General hygiene considerations: Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Slightly yellow liquid.
Physical state: Liquid.
Odour: Sour or pungent odor.
pH: 1.0-2.0 (10%)
Melting point/freezing point: 53.24°F (11.8°C)
Boiling Point/Range: 329°F (165°C) (at 760 mm Hg).
Evaporation rate: Not available.
Flash point: 179.6°F (82.0°C) Closed Cup.
Flammability (solid, gas): Not applicable.
Vapor pressure: 1.29 mm Hg at 25°C.
Viscosity: Not applicable.
Solubility in water: Miscible
Solubility (other): Ethyl alcohol
Auto-ignition temperature: 581°F (305°C)
Decomposition temperature: Not applicable.

SECTION 10. STABILITY AND REACTIVITY

Reactivity: No reactivity hazards known.
Chemical stability: Risk of ignition.
Conditions to avoid: Heat. Flames. Sparks. Avoid temperatures exceeding the flash point.
Hazardous decomposition products: Irritating and/or toxic fumes or gases. Emits toxic fumes under fire conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Ingestion: Causes digestive tract burn.
Acute toxicity: LD50 Intravenous - mouse - 3533 mg/kg
Inhalation: Due to lack of data the classification is not possible.
Skin contact: Causes severe skin burns.
Eye contact: Causes severe eye burns. Causes serious eye damage

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity: No ecotoxicity data noted for the ingredient(s).
Persistence and degradability: No data is available on the degradability of this product
Bioaccumulative potential: Not available.
Mobility in soil Not available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal instructions Dispose in accordance with all applicable regulations. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

Local disposal regulations Not available.

Hazardous waste code Not regulated.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

SECTION 14. TRANSPORTATION INFORMATION

DOT

UN number UN3265

UN proper shipping name Corrosive liquid, acidic, organic, n.o.s. (Pyruvic acid)

Transport hazard class(es)

Class or Division 8 Corrosive materia

Packing group II

IATA

UN number UN3265

UN proper shipping name Corrosive liquid, acidic, organic, n.o.s. (Pyruvic acid)

Transport hazard class(es)

Class or Division 8 Corrosive materia

Packing group II

Passenger and cargo aircraft Allowed

Cargo aircraft only Allowed

Transport in bulk according to Annex II of MARPOL Not available

73/78 and the IBC Code

SECTION 15. REGULATORY INFORMATION

US federal regulations CERCLA/SARA Hazardous Substances - Not applicable.

All components are on the U.S. EPA TSCA Inventory List.

Superfund Amendments and Reauthorization Act of 1986 (SARA)
**Hazard categories**

- Immediate Hazard - Yes
- Delayed Hazard - No
- Fire Hazard - Yes
- Pressure Hazard - No
- Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

- No

**SARA 311/312 Hazardous chemical**

- Yes

**Other federal regulations**

- Safe Drinking Water Act (SDWA) - Not regulated.
- Food and Drug Administration (FDA) - Not regulated.

**US state regulations**

- California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**SECTION 16. OTHER INFORMATION**

**References:** Not available

**Other Special Considerations:** Not available

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Jinan Jiuan Ester Chemical Co., Ltd. be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Jinan Jiuan Ester Chemical Co., Ltd. has been advised of the possibility of such damages.

End of Safety Data Sheet

JINAN JIUAN ESTER CHEMICAL CO., LTD