Safety Data Sheet (Translated form Chinese)

1. Substance and vendor information

Substance name: Ethanol

Other names:

Recommended uses and restricted uses:

Solvent for resins, fats, fatty acids, oils, alkenyl hydrocarbons;
Extraction media;
Manufacture of acetaldehyde, acetic acid, ethylene, dibutyl, dibutyl, 2-ethylhexanol, dyes, pharmaceuticals, elastomers, detergents, surface coatings, cosmetics, explosives, antifreeze, beverages, antiseptic, gasoline alcohol, fermentation media.

Name, address and telephone number of the supplier:

Taiwan Sugar Coporation Biotechnology Business
No.60, Dahu Farm, Dalin Township, Chiayi County 622, Taiwan, R.O.C.

Name, address and telephone number of the manufacturer:

Taiwan Sugar Coporation Xinying By-Products Factory Food Workshop
No. 690, Sec. 5, Yishi Rd., Liuying Dist., Tainan City 736, Taiwan (R.O.C.)

Emergency contact:

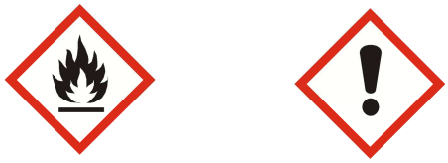
TEL: 05-2649775
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2. Hazard identification

Classification of the substanceor mixture:

Flammable liquid Category 2
Serious Damage/Eye irritation Category 2A

Label elements:
Pictogram: Flame, exclamation mark



Signal word: Danger

Hazard statement(s):	Highly flammable liquid and vapour. Causes serious eye irritation.
Precautionary statement(s):	Keep container tightly closed. Keep away from the ignition source - no smoking. If eye contact, rinse immediately with plenty of water and get medical attention. Wear eye protection/ face protection.

Other hazards:

3. Composition/information on ingredients

Pure substance:

English name: Ethanol

Synonyms: Alcohol, Ethyl alcohol

CAS No.: 64-17-5

Hazardous ingredient (Ingredient Percent): 100

Concentration or concentration range (Ingredient Percent): 95

4. First aid measures

Description of first aid measures:

Inhalation:
1. Move the exposed person from the contaminated area to fresh air.
2. If not breathing, clear the respiratory tract and give artificial respiration.
3. If breathing is difficult, give oxygen.
4. Keep the patient in a warm rest.
5. Get medical attention immediately.

Skin contact:
1. Wash affected areas thoroughly with soap and water.
2. Remove contaminated clothing immediately.
3. If irritation persists, get medical attention immediately.

Eye contact:
1. Rinse immediately with plenty of water for at least 15 minutes.
2. Eyelids should be lifted off the eyeball to be thoroughly cleaned.
3. Get medical attention immediately.

Ingestion:
1. If the patient is conscious, give 1 to 3 glasses of water or milk to dilute the contents in the stomach.
2. If the patient has any vomiting, observe whether breathing is difficult.
3. Do not induce vomiting, if the patient is unconscious or convusling.
4. Keep the patient in a warm rest.
5. If ingestion a lot or gastrointestinal symptoms occur, get medical attention immediately.

Most important symptoms and effects: Irritation, inhalation of the lungs may cause pneumonia.

Protection for first-aiders: First-aid should be carried out in a safe area with at least Class C protective equipment.

Notes to Physician: -

5. Fire-fighting measures

Suitable extinguishing media: carbon dioxide, dry chemical, alcohol-resistant foam.

Special hazards arising from the substance or mixture:
1. Vapors may form flammable or explosive mixtures with air at ambient temperature. Vapors may travel to ignition source and flash back.
2. Vapors traveling to the sewer may have risks of fire and explosion.
3. Container may explode when heated.
4. Vapors will accumulate in low or confined areas.

Special Fire Fighting Procedures:
1. Spray water to cool containers, buildings and protectors exposed to the fire.
2. If the spill(or leak) is not ignited, ventilate the spill(or leak) area and spray water to disperse the vapor.
3. Dilute the spill(or leak) with water and flush it away from ignition source, and avoid flushing into public sewers and drinking water systems.
4. If there is any storage tank or tank truck in the fire, isolated the region of 1/2 mile radius.
5. Retreat and extinguish the fire from a safe distance or protected location.
6. Located upwind and away from the fire to avoid dangerous vapors and toxic decomposition products.
7. Stop the spill(or leak) before extinguishing fire. If the spill(or leak) cannot be stopped and there is no danger around it, let the fire burn out. If extinguish fire before stopping spill(or leak), vapor will form explosive mixtures with the air and ignite again.
8. Isolate unfired substances and protect personnel.
9. Move the container away from the fire if safe to do so.
10. Cool the reservoir or container exposed to the fire with water mist.
11. Water mist fire fighting may not be effective unless firefighters received fire extinguishing training for various flammable liquids.
12. If the spill(or leak) is not ignited, spray water mist to disperse the vapor and protect the person trying to stop the spill(or leak).

13. Fire extinguishing with columnar water stream is invalid.
14. Large-scale fire in large area, use unmanned water mist control racks or automatic swing fire water nozzles.
15. If practicable, evacuate and let the fire burn out.
16. Keep away from the storage tank.
17. When the tank safety valve sounds or discolors due to fire, evacuate immediately.

Special protective equipment for firefighters:
Wear self-contained breathing apparatus, protective gloves and clothing for firefighting.

6. Accidental release measures

Personal precautions:
1. Restrict the entry of personnel until the spill(or leak) area is completely clean.
2. Confirm that the cleanup is performed by trained personnel.
3. Use appropriate personal protective equipment.

Environmental precautions:
1. Ventilate the spill(or leak) area.
2. Remove all ignition sources.
3. Notify government agencies related to occupational safety, health and environmental protection.

Method for containment and cleaning up:
1. Keep the idlers away.
2. Located upwind; do not enter the low-lying area.
3. Isolate the hazardous areas and avoid entry.
4. Fire, flame and smoking are prohibited in the hazardous area.
5. Contact the supplier or fire department for technical advice and assistance.
6. Stop spill (or leak) if safe to do so.
7. Spray water to reduce vapors.
8. Avoid spill(or leak) entering into the sewer, which may cause fire or explosion.
9. Small spill: Absorb with sand, incombustible absorbent or other known absorbent, then rinse the spill(or leak) area with water.
10. Large spill: Handling after the containment dike is completely installed around the the spill(or leak).

7. Handling and storage

Handling:
1. No eating and no smoking in the operation area.
2. Vacant containers may contain toxic, flammable, combustible, explosive residues or vapors.
3. Do not cut, grind, drill, weld or reuse vacant containers unless proper precautions are taken against the hazards.

Storage:
1. Keep container tightly closed.
2. Store in a cool, dry, isolated and well-ventilated area away from heat, ignition sources and incompatible materials.
3. Grounded piping and equipment for transport to reduce the risk of ignition or explosion due to electrostatic sparking.
4. No eating and no smoking in operation area or storage area.
5. Vacant containers may contain toxic, flammable, combustible, explosive residues or vapours.

8. Exposure controls/personal protection

Engineering controls:

Control parameters:			
8-hour time weighted average TWA	short-term exposure limit STEL	maximum permissible exposure limit CEILING	biological exposure indices BEIs
1,000 ppm	1,000 ppm	-	-

Personal protective equipment: • Respiratory protection: 1. Supplied air (3,300 or less ppm) breathing apparatus or full-face respirator (self-contained breathing apparatus). 2. Unknown or IDLH concentration: Use full-face positive-pressure air respirator, or full-face positive-pressure supplied air respirator with auxiliary positive pressure air breathing apparatus. 3. Escape: Escape breathing apparatus. • Hand protection: Chemical protective gloves, preferably made of butyl rubber, viton, 4H. • Eye protection: Tight fitting chemical goggles, face masks/shields. • Skin and body protection: Apron, arm protection.
Health measures: 1. Take off the contaminated clothing as soon as possible after work. Wash contaminated clothing before reusing and discarding. Tell the laundry staff the hazards of pollutant. 2. No smoking and no eating in the workplace. 3. Wash hands thoroughly after handling this substance. 4. Maintain the workplace clean.

9. Physical and chemical properties

Appearance (physical state, color, etc.): Colorless, transparent, volatile liquid	Odor: Alcohol-like
Kinematic viscosity:1.4～1.5㎟/s（cSt）at 20 degC	Melting point: -114 ~ -114.5 °C
pH : -	Boiling point / boiling range: 78.4 ° C
Flammability (solid, gas): -	Flash point: 13 ° C Method: closed cup
Decomposition temperature:	
Auto/self-ignition temperature: 363 ° C	Explosion limit: 3.3% ~ 19%
Vapor pressure: 44.3 mmHg	Vapor density: 1.6 (air = 1)
Density: 0.789 (water = 1)	Solubility: Miscible with water
n-octanol/water Partition coefficient (log Kow): -0.31 ~ -0.32	Particle characteristics: Not applicable

10. Stability and reactivity

Stability: Stable under normal conditions.
Possible hazardous reactions under special conditions: 1. Oxidants: Vigorous reaction. 2. Hydrogen peroxide: Mixture may explode when exposed to heat or vibration. 3. Perchloric acid, silver nitrate, ammonia: May form a mixture of vibration sensitive. 4. Alkali metal: Explosive reaction. 5. Acid, acid anhydride: Vigorous reaction, exothermic reaction.
Conditions to avoid: -
Incompatible materials: Oxidizing agents, mineral acids, strong acids, strong bases.
Hazardous decomposition products: -

11. Toxicological information

Routes of exposure: inhalation, skin contact, eye contact, ingestion

symptoms: excitement, intoxication, headache, dizziness, sleepiness, blurred vision, fatigue, trepidation, paralysis, loss of consciousness, lethargy, respiratory arrest, hypoglycemia, and extensor stiffness. Skin may come off sebum, red, itchy, inflamed, and cracked.

Acute toxicity:
Skin: 1. Irritate slightly.
Inhalation: 1. May irritate respiratory tract and mucous membranes. 2. May cause damage to the central nervous system. Symptoms include excitement, intoxication, headache, dizziness, sleepiness, blurred vision, fatigue, trepidation, paralysis, loss of consciousness, lethargy, respiratory arrest and death.
Ingestion: 1. May cause damage to the central nervous system. Symptoms are listed in "Inhalation". 2. Severe acute poisoning may cause hypoglycemia, hypothermia and extensor stiffness 3. Inhalation of the lungs may cause pneumonia.
Eyes: 1. Exposure to liquids, vapors, fumes or mists may cause moderate irritation. 2. Direct contact may cause irritation, pain, corneal inflammation, and corneal damage.
LD_{50} (test animals, route of exposure): 7,060 mg/kg (rat, oral)
LC_{50} (test animals, route of exposure): 20,000 ppm/10 hr (rat, inhalation)
20 mg/24 hr (rabbit, skin): Causes moderate irritation
500 mg (rabbit, eye): Causes severe irritation.

Chronic or long-term toxicity:
1. Repeated or prolonged skin contact: May cause sebum off, redness, itching, inflammation, cracking and possible secondary infection.
2. Long-term skin contact: May cause skin irritation to a few people.
3. Ingestion: Chronic poisoning may cause liver, kidney, brain, gastrointestinal tract and myocardium decline.
4. May cause adverse effects on reproduction.
5. Increase the harm to those who suffered from liver disease.
6. Use together with other drugs may cause adverse effects.
200 mg/kg (woman 5 days before mating, intrauterine) affects female fertility.
8 mg/kg (woman with 32 weeks of pregnancy, intravenous injection) affects the Apgar score (a comprehensive estimate of newborn's pulse/heart rate, respiration, muscle tone, and reflex irritability grimace).

12. Ecological information

Ecotoxicity:
LC_{50} (fish): 13,480mg/L/96H
EC_{50} (aquatic invertebrate): -
Bioconcentration factor (BCF): -

Persistence and degradability:
Possible environmental impact / enviromental distribution
1. When released into the water, it may evaporate and biodegrade so that no accumulation in fish. In natural water, no real data shows it's biodegradable, but experimental data shows that ethanol can rapidly biodegrade.
2. When released into the air, ethanol will be photolyzed in about 4-6 days. In addition, the rain wash will remove it.
Half-life (air): 12.2~122 hours
half-life (surface water): 6.5~26 hours
half-life (groundwater): 13~52 hours
half-life (soil): 2.6~24 hours

Bioaccumulation: -

Mobility in soil: When ethanol spills into the soil, it will evaporate, biodegrade or leak into the groundwater.
Other adverse effects: High toxicity to aquatic organisms.

13. Disposal considerations

Waste disposal methods: Refer to relevant regulations.

14. Transportation information

UN number: 1170
UN proper shipping name: Ethanol or ethanol solution
Transport hazard class: 3 (flammable liquid)
Packing group: II
Bulk Transport Regulations :Not applicable (for general packaged transport in drums or bottles).
Marine pollutant (Yes / No): No
Special shipping methods and precautions: An aqueous solution containing no more than 24% alcohol by volume is not subject to the regulations of this classification.

15. Regulatory information

Regulations/legislation specific for the substance or mixture in Taiwan: 1. Occupational Safety and Health Act. 2. Regulations for the Labeling and Hazard Communication of Hazardous Chemicals. 3. Standards of Permissible Exposure Limits at Job Site. 4. Road Traffic Management and Penalty Act. 5. Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste. 6. Public Hazardous Substances & Flammable Pressurized Gases Establishment Standards & Safety Control Regulations. 7. Regulations for the assessments, risk ranking management of Hazardous Chemicals (Translated from Chinese).

16. Other Information

References	1. CHEMINFO Database, CCINFO Disc, 2005-2 2. RTECS Database, TOMES PLUS Disc, Vol.63, 2005 3. HSDB Database, TOMES PLUS Disc, Vol.63, 2005 4. Chem Watch Database, 2004-4
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Date	2026.11.04
Remarks	The symbol "-" in the above information represents no relevant information is found currently, and the symbol "/" means that the field is not for the substance.

The above information is produced by the Occupational Safety and Health Administration, Ministry of Labor. The data and information is for reference only. Users should judge the availability according to the application requirements. In particular, it is necessary to pay attention to the possible hazards during mixing and provide necessary safety and health precautions for labor according to the relevant regulations of hazardous chemicals labeling and general rules.

Note: The Chinese original is the actual content, and this English translation is for reference only.