Section 1 - Product and Company Identification

Product name：Ethylene Glycol
Other names：--
Product use：Raw materials for polyester, anti-freeze, desiccants, engineering plastics, PET bottles and brake fluids.
Supplier's name：San Fu Chemical Co., Ltd.
Supplier's address：1,Sec.1,Huanyuan E..Rd.,Liuying Dist.,Tainan, Taiwan 736.
Supplier's phone：886-6-6231821 Emergency phone：886-6-6231821
FAX.：886-6-6231822

Section 2 - Hazards Identification

Classification：

1. Acute Toxic Substance (Ingestion), Category 5
2. Serious Eye Injury/Irritation Substance, Category 2
3. Specific Target Organ Systematic Toxicity - Repeated Exposure Category 1

The Most Important Hazards and effect

Label element：

- Hazard symbol： Exclamation Mark, Health Hazard

- Signal word：Danger

Hazard statement：

1. May be harmful if ingested
2. Causes eye irritation
3. Prolonged or repeated exposure will cause specific organ damage.

Precautionary statement：

1. If comes in contact with eyes, wash immediately with large amount of water and then seek medical care.
2. Once the clothes are contaminated, remove immediately
3. Avoid exposure to this substance – must follow special instructions for use.

Others Hazard：--

Section 3 - Composition/Information on Ingredients

pure substance：

Chemical Name：Ethylene Glycol
Synonyms：Glycol, Ethylene Alcohol, 1,2dihydroxyethane, 1,2ethanediol, Ethylene Dihydrate, Glycol Alcohol
Cas No.：107-21-1
Ingredient contributing to the hazard(%)：100%

Section 4 - First Aid Measures

The First-aid Information：

- Inhalation：
  1. Remove the pollution sources or move patient to a place with plenty of fresh air.
  2. Seek medical attention immediately.
- Skin Contact：
  1. Remove contaminated clothes, shoes and leather items (such as watch straps, belts).
  2. Use gentle running water to wash the contaminated area for over 10 minutes.
  3. If irritation persists, wash repeatedly.
  4. Seek medical attention immediately.
  5. Thoroughly clean contaminated clothes, shoes, and leather products before reuse or disposal.
- Eye Contact：
  1. Immediately lift the eyelids, use warm running water to wash contaminated eye(s) for 10 minutes.
  2. If irritation persists, wash repeatedly.
  3. Seek medical attention immediately.
- Ingestion：
  1. If the patient is about to lose consciousness, is unconscious or in convulsion, do not feed anything through the mouth.
  2. Do not induce vomiting. Let the patient drink 240~300 ml of water.
  3. If the patient is vomiting spontaneously, give water repeatedly and rinse mouth.
  4. If breathing has stopped, perform respiration. If breathing is difficult, have qualified personnel administer oxygen.
  5. Get prompt medical attention.

The Most Important Symptoms and Hazardous Effects：

1. Ethylene glycol can be absorbed through skin eczema.
2. A dosage of 100 ml can cause death.

Protection of First-aiders：Must wear Class C protective equipment for performing first-aid in safe area.

Notes to a Physician：For ingestion, consider gastric lavage.

Section 5 - Fire Fighting Measures

Extinguishing Media：
Dry Chemical, alcohol-resistant foam, carbon dioxide, polymer foam, water mist.

Specific Hazards when Fire-fight：
Using water mist or foam to extinguish fire may cause frothing.

Specific Fire-fighting Procedure：

1. Spraying water mist on the liquid surface will cool and cause frothing, thereby extinguishing the fire.
2. If the spillage ignites, use water mist to disperse the vapor.

Specific Protection of Firefighters：
Fire fighters must wear air respirators, protective gloves and fire-fighting outfits.

Section 6 - Accidental Release Measures

Personal Precautions：

1. Restrict personnel from entering the leaking area until completely cleaned.
2. Make sure that only trained personnel are allowed to clean up.
3. Wear appropriate personal protection equipment.

Environmental Precautions：

1. Ventilate and change the air in the leakage area.
2. Remove all ignition sources.
3. Notify the relevant government safety, hygiene and environmental protection agencies.

Methods for Cleaning up：

1. Do not touch the leaking substance.
2. Prevent the spilled substances from entering the drainage, canals or closed spaces.
3. If safety permits, try to stop or reduce the spillage.
4. Surround the leakage with sand, soil or other adsorbing substances that will not react with the leaking substance.
5. For small amount of leakage: absorb using absorbents that will not react with the leaking substance. Contaminated absorbents are as hazardous as the leakage and must be kept in covered and labeled containers. Wash the leakage area with water. Small amount of leakage can be diluted with large amount of water.
6. Large amount of leakage: Contact the fire department, emergency rescue agency and supplier for assistance.

Section 7 - Handling and Storage

Handling：

1. The storage area must be installed with the proper protective equipment. The work personnel must be properly trained and notified of the danger and safe usage of this substance.
2. If this substance is released in the storage site, immediately wear the respirator and perform the proper disposal.
3. Before operation, check if the container is leaking. Consider using a closed system to operate this substance.
4. Avoid producing steam and condensation. Also prevent the steam and condensation from entering the air in the work area.
5. The specific gravity of steam is greater than air, will accumulate in low-lying, enclosed areas, storage areas or poor ventilation areas.
6. The personnel should be positioned at upwind position for all opening, reversal and mixing operations.
7. Do not store contaminated liquid back into the original storage container.

Storage：

1. Stay far away from heat sources and incompatible substances during storage and operation in order to avoid producing toxic heat decompositions or violent reactions.
2. Empty vessels, containers and pipes may still contain hazardous residues. Clean properly before soldering, cutting, drilling or heating.
3. Apply minimum amount for operation in specified area with excellent ventilation and separate from the storage area.
4. Do not use with incompatible substances (such as strong oxidizer and strong base) as it will produce violent reactions.

Section 8 - Exposure Controls & Personal Protection

Engineering measures：

1. Overall gas exchange installation.
2. Local exhaust ventilation system may be required during heating and formation of condensation.
3. Provide sufficient fresh air supply to supplement the air discharged by the exhaust ventilation system.

Control parameters			
TWA	STEL	Ceiling	Biological standards
--	--	50 ppm	--

Personal protective equipment：

- Respiratory Protection：No special requirements.
- Hand Protection：Leak-proof gloves made of natural rubber, neoprene rubber, polyvinyl chloride, butyl rubber, Viton, Teflon, Saranex, Barricade, 4H, Terllchem HPS, polyvinyl and nitrile rubber.
- Eye Protection：Chemical safety goggles and masks.
- Skin and Body Protection：Whole-body protective outfit, work pants, apron and work boots made of rubber mentioned above.

Hygiene measures：

1. After work, remove the contaminated clothes as quickly as possible. Throw away or wash clothes thoroughly before wearing again. Notify the laundry personnel of the danger of the contaminated clothes.
2. Smoking and eating are strictly prohibited in work areas.
3. Wash hands thoroughly after handling this substance.
4. Keep the work area clean.

Section 9 - Physical & Chemical Properties

Appearance：Clear, moisture-absorbing liquid	Odor：Sweet odor
Odor threshold value：0.08ppm	Melting Point: -13℃
pH value：7 (Neutral)	Boiling point/boiling range：198℃
Flammability: /	Flash point：111℃
Decomposition temp：/	Test method：Close Cup
Auto ignition temp：398℃	Explosion properties：3.2% ~15.3%
Vapor pressure：0.05mmHg	Vapor density：2.14 (air = 1)
Density：1.1135 (water = 1)	Solubility：Completely soluble in water
log Kow：-1.93~-1.36	Evaporation Rate：/

Section 10 - Stability & Reactivity Data

Stability：Stable under normal conditions.
Possible hazardous reactions under specific conditions： 1. Avoid temperature over 111℃.

2. Strong oxidizers (such as perchloric acid, nitrate, butyric acid): Increases the danger of fire and explosion.
3. Tetraphosphorus trisulfide: High temperature will cause explosion.
4. Strong base (such as sodium hydroxide): produces decomposition.
5. Perchloric acid: produces violent reaction.
6. Strong acid (such as fuming sulfuric acid, 96% sulfuric acid, chlorosulfonic acid):The pressure will increase in tightly shut container.
7. DC silver – copper wires: will burn on contact
8. Aluminum: will be corroded by ethylene glycol over 100℃.

Conditions to avoid：

1. Avoid temperature over 111℃.
2. DC silver – copper wires

Materials to avoid：

1. Strong oxidizers (such as perchloric acid, nitrate, butyric acid).
2. Tetraphosphorus trisulfide
3. Strong base (such as sodium hydroxide)
4. Perchloric acid
5. Strong acid (such as fuming sulfuric acid, 96% sulfuric acid, chlorosulfuric acid)
6. Aluminum

Hazardous decomposition products：/

Section 11 - Toxicological Information

Route of exposure：inhalation, skin, ingestion, eye

Symptoms：Irritation, respiratory failure, cardiovascular failure, pulmonary edema

Immediate Toxicity：

■ Skin contact
1. Liquid will cause irritation.
2. Ethylene glycol will be absorbed through the skin eczema. Symptoms are similar to ingestion.

■ Inhalation:
1. Its vapor and condensation will cause nose and throat irritation.
2. Cannot endure overlong at concentration higher than 50 ppm due to throat irritation.
3. Its vapor is low and will not cause visible intoxication at room temperature, but exposure to its condensation at high temperatures will cause injury.

■ Ingestion:
1. Induces symptoms of suppression of central nervous system such as nausea, vomiting, lower abdominal pain, feebleness, fatigue, dizziness, absent-mindedness, convulsion, shocks, etc.
2. Will cause death due to respiratory and cardiovascular failure.
3. A dosage of 100 ml may be lethal. If patient survives, may have kidney failure after several days.
4. May cause blocked vision in some cases.

■ Eye contact:
1. Liquid will cause irritation and inflammation of the eyelids but will not cause permanent damage.
2. Steam and condensation will irritate eyes.
   - LD_{50}: 4700 mg/kg (Rat, ingestion)

● LC_{50}: -- ● 12mg/m3/3D (Rat, eye): causes irritation
Specific effects： Inhalation: 1. Exposed to a concentration of under 12 ppm for 22 hours a day continuously for 28 days will only induce mild throat irritation, headache and lower back pain. 2. Prolonged exposure to vapor and condensation produced at over 100℃ will cause unconsciousness and trembling of eyeballs. 3. 50mg/kg (6~15 days pregnant female rat, ingestion) will cause abnormal fetus development.

Section 12 - Ecological Information

Ecotoxicology： ■ LC_{50}(fish)：18500-4100mg/l/96H ■ EC_{50}(Aquatic Invertebrates)：-- ■ Bioconcentration factor (BCF)：10-190
Persistence and degradability： 1. Ethylene glycol inside the body will be decomposed and discharged. 2. Theoretically, in the presence of 100% oxygen, ethylene glycol will decompose completely in 1-4 days. In reality, it will probably take several weeks. 3. Will decompose in water and will not absorb the deposits. ■ Half-life (air): 8.3~83 hours ■ Half-life (water surface): 48~288 hours) ■ Half-life (underground water): 96~576 hours ■ Half-life (soil): 48~288 hours
Bioaccumulative potential：/
Mobility in soil：When ethylene glycol is released into the soil, it will enter the underground. Its flowing and spreading effect is unclear.
Other adverse effects：/

Section 13 - Disposal Considerations

Methods of disposal： 1. Dispose according to the waste substance clearing laws and regulations. 2. Follow the warehouse conditions in storing waste substances waiting for disposal. 3. Dispose according to special incinerating or hygienic landfill laws.

Section 14 - SDS Transport Information

UN classification number：--
Proper D.O.T Shipping Name：Ethylene Glycol
Hazard Class：--
Packing Group：--
Marine pollution：No
Specific precautionary transport measures and conditions：--

Section 15 - Regulatory Information

Regulations：

1. Occupational Safety and Health Act
2. Regulations for the Labelling and Hazard Communication of Hazardous Chemicals
3. Road Traffic Safety Regulations
4. Industrial Waste Storage and Disposal Regulations
5. Assessment and Classification Administration of Hazardous Chemicals
6. Permissible Exposure Limits of Hazardous Substances in the Work Environment
7. Public Hazardous Materials and Flammable Pressurized Gases Establishment Standards and Safety Control Regulations.

Section 16 - Other Information

Literature references	1. RTECS Database, TOMES PLUS CD, Vol. 68, 2006 2. ChemWatch Database, 2006-1 3. OHS MSDS Database, 2006-1 4. HSDB Database, TOMES PLUS CD, Vol. 68, 2006	
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Re-revision date	May-3th 2028	
Remarks	Symbols Explanations: “--” No information is available at this time. “/” Not applicable to this substance.	

■ This information above has consulted national or international papers and manufacturer or supplier’s provided information. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Users should make their own determination of the suitability of the information for their particular purposes.