



Safety Data Sheet

I. Identification of the Substance/ Preparation and Company

Product Information: ETHANOLAMINE		
Other Information: -		
Suggested Use and Prohibitions: Home and industrial use cleaning agents, textile auxiliaries, acidic gas absorption, medicine intermediate, electronics detergent, water treatment, resin auxiliaries, metal surface treatment, wood preservation.		
Information on Producer/Supplier Name, Addresses, Phone: Lin Yuan Plant, Oriental Union Chemical Corporation No.3 Industrial 3rd Rd., Industrial Zone Lin-Yuan, Kaohsiung,R.O.C +886 7 641-3101 ~ 9		
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II. Hazard Identification

Hazard Category: Class 4 Flammable liquid, Class 4 acute toxic substance (ingested), Class 4 acute toxic substance (skin), Class 1 metal corrosive substance, Class 1 skin corrosion/irritation substance, Class 1 serious eye damage/irritation substance.
Labeled Contents: Symbols: Warning sign: Danger Hazard Warning Information: Flammable liquid Hazardous if ingested Hazardous if contacted with skin May corrode metal Causes serious skin burns and eye damage Causes serious eye damage Hazard Prevention Measures: Do not inhale gas/smoke/steam/fog Wear goggles/masks Only use in well-ventilated areas.

III. Composition / Information on Ingredients

(Single)

English Name: ETHANOLAMINE
Synonyms: AMINOERHYL ALCOHOL, β -AMINOETHYL, ALCOHOL, MEA, 2-AMINOETHANOL, 2-HYDROXYETHYLAMINE, ETHYLOLAMINE, GLYCINOL, MONOETHANOLAMINE, OLAMINE
Chemical Abstracts Number (CAS No.): 141-43-5
Percentage for Chemical Ingredient (%): 100

IV. First Aid Measures

Emergency and First Aid Procedures:

Inhalation:

1. Remove pollution sources or move the patient to area with plenty of fresh air.
2. If there is difficulty in breathing, let trained personnel provide oxygen supply under the doctor's supervision.
3. If unnecessary, do not move the patient.)
4. Symptoms of pulmonary edema may be delayed.)
5. Seek medical care immediately.

Skin Contact:

1. If necessary, wear leak-proof gloves to prevent contact with this chemical substance.
2. Use gentle, warm water to wash the contaminated parts for 20 to 30 minutes.
3. If irritation persists, wash repeatedly.
4. While flushing with water, remove contaminated clothes, shoes and leather items.
5. Seek medical attention immediately.
6. Make sure to remove the dirt completely from the contaminated clothes, shoes and leather items before re-use or disposal.

Eye Contact:

1. If necessary, wear leak-proof gloves to prevent contact with this chemical substance.
2. Immediately lift the eyelids, use running warm water to wash contaminated eye(s) for 20 minutes.
3. If possible, wash with saline solution continuously.
4. Prevent clean water from contacting the unaffected eye.
5. If irritation persists, wash repeatedly.
6. Seek medical attention immediately.

Ingestion:

1. If the patient is about to lose consciousness, is unconscious or is in convulsion, do not feed anything through the mouth.
2. If the patient is conscious, let the patient rinse his/her mouth completely with water.
3. Do not induce vomiting.

4. Let the patient drink 240 ~ 300 ml of water to dilute the chemical substances in the stomach. If milk is available, let the patient drink it after drinking the water.
5. If the patient is vomiting, let his/her body incline forward to reduce the danger of inhalation, rinse the mouth and give water repeatedly.
6. Seek medical attention immediately.

Major Disease and Harm Effects:

Higher concentration may damage the lungs or even liver and kidneys.

First-Aid Personal Protection:

Personnel not wearing full-body protective outfit and air respirator are not allowed to enter the disaster area carry out patients. They should wear Class C protective equipment and apply first-aid in safe areas.

Prompt to Doctor:

If inhaled, provide oxygen to the patient. For ingestion, consider using esophagoscopy for check-up and avoid gastric lavage.

V. Fire Fighting Measure

Suitable Extinguishing Media:

Water spray, dry chemical powder, alcohol-resistant foam, polymer foam, carbon dioxide.

Special Exposure Hazards:

Flammable liquid that forms into an explosive mixture with air when over 85°C. May produce toxic/irritating gas in fire site.

Special Extinguishing Procedure:

1. Retreat and extinguish the fire from a safe distance or protected area.
2. Place at upwind position to avoid hazardous vapor and toxic solvent.
3. Use water mist to cool the storage tanks and containers exposed in the fire site.
4. If the spill is not burning, spray water mist to disperse the vapor and protect the personnel attempting to contain the spill.
5. Spray water to wash the spillage away from the ignition source.
6. Only allow personnel wearing special protective gear to enter.

Special Protection Equipment:

Wear full-body chemical protection outfits and air respirators (if necessary, add flash-proof aluminum covered coats).

VI. Accidental Release Measures

Personal Protection:

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

Environmental Protection:

1. Ventilate or change air in this area.
2. Extinguish or remove all fire sources.
3. Report to 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. Use pump or vacuum equipment to clear liquids and place in covered containers.
6. For small amount of leakage: absorb using absorbents that will not react with the leaking substance. Contaminated absorbents are as dangerous as the spillage and must be kept in properly covered and labeled containers. Wash the spilled area with water. Small amount of leakage can be diluted with large amount of water.
7. Large leakage: Contact the fire department, emergency rescue agency and supplier for assistance.
8. Used absorbents contain contaminants and are just as dangerous.

VII. Handling and Storage

Handling:

1. This substance is toxic, corrosive and flammable that requires engineering control and use of personal protective equipment. Work personnel must be trained properly and notified of the danger and the safe usage of this substance.
2. Report immediately if there is leakage or poor ventilation.
3. Familiar with the indications, symptoms and first-aid procedure for intoxication.
4. Avoid causing condensation and prevent condensation from entering the air in the work area.
5. Before operation, check if the container is leaking. As much as possible, use a closed system for operation.
6. Use anti-corrosion transport equipment for repacking. For small packings, use self-closing and light containers.
7. Containers must be labeled. Open carefully in stable areas. When not in use, keep the containers tightly closed to prevent damages.
8. Empty vessels, containers and pipes may still contain hazardous residues. Clean properly before soldering, cutting, drilling or heating.
9. Do not use with incompatible substances.
10. Apply minimum amount for operation in specified area with excellent ventilation. Work area and storage area must be separated.

11. Clean the flammable substances and ignition sources.
12. Post the “No Smoking” sign.
13. The operation area must have emergency rescue equipment for fire and leakage that is ready at all times.

Storage:

1. Store in areas that are dry, well ventilated and without direct exposure to sunlight, far from heat, ignition sources and incompatible substances.
2. Storage area should be labeled clearly, free of obstacles and only specified or trained personnel are allowed to enter.
3. Work area and storage area must be separated; store far from elevators, structures, room exits or main channels.
4. Check regularly for damages or leakage.
5. The storage area should have proper fire extinguishers and equipment for cleaning leakages nearby.
6. The storage area must be constructed of fire-proof materials.
7. Check if new containers are tightly closed and prevent damages.
8. Limited amount of storage.
9. Store in proper and labeled containers. Keep containers that are empty or not in use tightly closed and prevent damages.
10. Substances that may spill should be stored in trays made of compatible materials.
11. Readily available spillage absorbents.
12. The doorway should have a slope, doorsill or gully to surround or flow to safe places.
13. The floor must be made of non-permeable materials to prevent seeping into the ground.
14. Empty cylinders should be separated from the storage area.
15. Empty containers may still contain hazardous residues.
16. Store according to the storage temperature recommended by the chemical manufacturer or supplier.

VIII. Exposure Control / Personal Protection

Engineering Control:

1. Use stand-alone anti-corrosion exhaust ventilation system.
2. Exhaust opening must be connected directly outdoors.
3. Provide sufficient fresh air supply to supplement the air discharged by the exhaust ventilation system.

Control Factor

TWA	STEL	CEILING	BEI _s
3ppm	6ppm	-	-

Personal Protection Equipment:

Respiratory Protection:

Under 30ppm: Anti-ethanolamine filter type, powered air-purifying type, air-supplying

type and self-contained breathing apparatus.

Unknown concentration: Positive pressure self-contained breathing apparatus, positive pressure full-face air-supplying respirator supplemented by positive pressure self-contained breathing apparatus.

Escape: Anti- ethanolamine filter-type gas mask, escape-type self-contained breathing apparatus.

Hand Protection:

Leak-proof gloves made of butyl rubber, neoprene rubber, nitrile rubber, Viton and 4H.

Eye Protection:

1. Chemical safety goggles and masks.
2. Eye wash facility.

Skin & Body Protection:

Whole-body protective outfit, emergency bathing facility and work boots.

Hygiene Procedures:

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 or eating is strictly prohibited in the work site.
3. Wash hands thoroughly after handling this substance.
4. Keep the work area clean.

IX. Physical and Chemical Properties / Characteristics

Appearance: Colorless, sticky and moisture-absorbing liquid	Odor: Fishy smell and ammonia odor
Odor threshold: 2.6ppm	Melting point: 10.3°C~10.5°C
pH value: 12.1 (25% water-soluble solution)	Boiling Point / Boiling Range: 171°C~172°C
Flammability: -	Flash Point: 85°C
Decomposition Temperature: -	Test Method: Close Cup
Spontaneous Temperature: 410°C	Exposure Limits: 5.5 % ~17%
Vapor Pressure: 0.3 hPa @ 20 °C	Vapor Density: 2.1 (air = 1)
Specific Gravity: 1.018 (water = 1)	Solubility: Completely soluble in water
Log kow: -1.31	Percent volatile: < 1 (n-butyl acetate = 1)

X. Stability and Reactivity

Stability: Stable under normal conditions.

Special Conditions of Hazardous Reaction:

1. Stable under normal conditions but will absorb the moisture in the air and react with carbon dioxide to form salts. Decomposes when exposed to sunlight. Oxidizes slowly in air, turns yellow and then brown. This reaction will accelerate due to the

<p>presence of heat and metals.</p> <ol style="list-style-type: none"> 2. Strong acid, hydrogen chloride and acid anhydride: violent reaction or induce explosion. 3. Strong oxidizer: Violent reaction. 4. Monomer (unsaturated chemical compound such as epoxide, chloroethylene, vinyl acetate, acrylic monomer, acrylic acid, etc.): Violent reaction. 5. Strong reduction agent (such as Hydrazine): Violent reaction. 6. Nitrocellulose: When ethanolamine acts as the heating agent for polymerization and comes in contact with a large surface area of nitrocellulose, it will produce self-combustion.
<p>Conditions to Avoid:</p> <p>Air, light, temperature over 85°C</p>
<p>Incompatibility:</p> <p>Strong acid, hydrochloric acid and acid anhydride, strong oxidizer, monomer, strong reducing agent, nitrocellulose</p>
<p>Hazardous Decomposition Products: -</p>

XI. Toxicological Information

<p>Exposure route: skin contact, inhalation, ingestion, eye contact</p>
<p>Symptoms:</p> <p>Burning sensation, coughing, asthmatic, sore throat, shortness of breath, headache, nausea, rashes, pain</p>
<p>Acute Toxicity:</p> <p>Skin:</p> <p>Will cause serious irritation and partial discomfort, pain, redness and swelling from chemical burns, blisters and tissue damages.</p> <p>Inhalation:</p> <ol style="list-style-type: none"> 1. Moderate irritating to nose, pharynx and respiratory tract under high concentration. May produce symptoms such as burning sensation, coughing, asthma, sore throat, shortness of breath, headache, nausea, vomiting and chest pains. 2. Higher concentration may seriously injure the lungs (such as chemically induced pneumonitis and pulmonary edema) and even liver and kidneys. <p>Ingestion:</p> <ol style="list-style-type: none"> 1. Ingestion will induce serious irritation, burning lips, throat, digestive tract, stomach causing stomachache, chest pain, nausea, vomiting, diarrhea, dizziness, thirst, weakness and collapse. 2. May cause shock, lowering of blood pressure, reduced pulse rate, cyanosis (skin discoloration), spasm, and coma. <p>Eye:</p> <ol style="list-style-type: none"> 1. Liquid will induce serious irritation, causing redness of eyes, swelling and chemical

burns.

2. Diluted solution will induce serious damage to the cornea.
3. Acute eye damage may lead to loss of eyesight.
4. Low concentration of amine steams will induce vision interference.

LD50 (test animal, absorption route): 1,720 mg/kg (Rat, ingestion)

LC50 (test animal, absorption route): -

Chronic:

1. Prolonged skin contact may cause chronic dermatitis.
2. Prolonged inhalation of steam may induce asthma, bronchitis and viral infection of upper respiratory tract.
3. 500 mg/kg (6-15 days pregnant female rat, ingestion) causes intoxication of fetus.

XII. Ecological Information

Eco-toxicity: LC50 (Fish): 170 mg/l/96H

EC50 (aquatic invertebrates): -

Bio-concentration Factor (BCF): <1

Durability and Degradability:

1. BOD (Biochemical Oxygen Demand) is 78% (5 days)
2. When released to water, it will produce biodegradation (half-life is several days to weeks).

Half-life (air): -

Half-life (water surface): -

Half-life (underground water): -

Half-life (soil): -

Biological Accumulation:

1. Ethanolamine will decompose into different compounds inside the body. Some of the ethanolamine will be exhaled and urinated but some will remain in the liver and kidneys, showing that portions may still accumulate inside the body.)

Fluidity in soil:

When released to the soil, it is expected to biodegrade rapidly.

Other adverse effects: -

XIII. Disposal Information

Disposal Information:

1. Refer to the relevant laws and regulations for handling.
2. Follow the warehouse conditions in storing waste substances waiting for disposal.
3. Dispose according to special incinerating or hygienic landfill laws.

XIV. Transport Information

The United Nations Number (Un-No): 2491
UN Transport Name: ethanolamine or ethanolamine solution
Transport Hazard Classification: Type 8 corrosive substance
Packaging Category: III
Marine Pollutant (Yes/No): No
Special Transport Way and Note: -

XV. Regulation Information

Apply Regulation: <ol style="list-style-type: none">1. Enforcement Rules of the Labor Safety and Health Act2. Regulations of Hazard Communication on Dangerous and Harmful Material3. Standards of Tolerable Hazardous Substance Concentration in the Air of Labor Working Environment4. Traffic Safety Regulations5. Standards for the Storage, Clearance, and Disposal of Industrial Waste6. Public Hazardous Materials and Flammable Pressurized Gases Establishment Standards and Safety Control Regulations

XVI. Other Information

Reference	1. Council of Labor Affairs, Executive Yuan, Taiwan, GHS in Taiwan website. http://ghs.osha.gov.tw/CHT/masterpage/index_CHT.aspx 2. Sigma-Aldrich Chemie GmbH (SAFETY DATA SHEET) 3. Oriental Union Chemical Corporation website http://www.oucc.com.tw/tw			
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Date	2016/05/09			
Note	The "-" symbol in the text above indicates that there is no current available data while the "/" symbol indicates that this field is not applicable to this substance.			