1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Material Name : Mono Ethylene Glycol Antifreeze Grade
Recommended use / Restrictions of use : Chemical intermediate. Advice in this document relates only to product as originally supplied. Other derivative chemicals will have different properties and hazards. Advice should be sought on their safe handling and use.

Product Code : 39537

Supplier : Chemical Specialties (S) Pte Ltd
31 Ayer Merbau Road
Singapore 627717
Telephone : +65 6578 9865
Fax : +65 6515 5203
Emergency Telephone Number : +65 6578 9865

2. HAZARDS IDENTIFICATION

GHS Classification : ACUTE TOXICITY - ORAL, Category 4
SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (REPEATED EXPOSURE), Category 2
Kidney.

GHS label elements

Symbol(s) :

Signal words : Warning
GHS Hazard statements : PHYSICAL HAZARDS

: Not classified as a physical hazard under GHS criteria.
: HEALTH HAZARDS:
: H302: Harmful if swallowed.
: H373: May cause damage to organs or organ systems through prolonged or repeated exposure.
: ENVIRONMENTAL HAZARDS
: Not classified as an environmental hazard under GHS criteria.

GHS Precautionary statements

Prevention : P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P260: Do not breathe dust/fume/gas/mist/vapours/spray.
Response : P301+P312: IF SWALLOWED: Call a POISON CENTRE or doctor/physician if you feel unwell.

P330: Rinse mouth.
P314: Get medical advice/attention if you feel unwell.

Storage : No precautionary phrases.

Disposal : P501: Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

Other Hazards which do not result in classification : Not classified as flammable but will burn.
ingestion may cause drowsiness and dizziness.
Inhalation of vapours or mists may cause irritation to the respiratory system.

Aggravated Medical Condition : Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Kidney.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Identity : Mono Ethylene Glycol
CAS No. : 107-21-1
EINECS No. : 203-473-3

Classification of components according to GHS

Chemical Name	Synonyms	CAS	Hazard Class (category)	Hazard statement	Conc.
Ethylene Glycol		107-21-1	Acute Tox., 4; STOT RE, 2;	H302;H373;	90.00 - 100.00 %
Diethylene Glycol		111-46-6	Acute Tox., 4; STOT RE, 2;	H302;H373;	0.01 - 10.00%

4. FIRST AID MEASURES

General Information : Not expected to be a health hazard when used under normal conditions.

Inhalation : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

Skin Contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.

Eye Contact : Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment.

Ingestion : DO NOT DELAY.
Do not induce vomiting. If victim is alert, rinse mouth and drink 1/2 to 1 glass of water to help dilute the material. Do not give liquids to a drowsy, convulsing, or unconscious person. Transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.

Notes to physician

Most important symptoms/effects, acute & delayed	: Kidney toxicity may be recognized by blood in the urine or increased or decreased urine flow. Other signs and symptoms can include nausea, vomiting, abdominal cramps, diarrhoea, lumbar pain shortly after ingestion, and possibly narcosis and death. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.
Immediate medical attention, special treatment	: May cause significant renal, respiratory, and CNS toxicity. May cause significant acidosis. Call a doctor or poison control center for guidance.

5. FIRE FIGHTING MEASURES

Specific Hazards	: Material will not burn unless preheated. Carbon monoxide may be evolved if incomplete combustion occurs. Containers exposed to intense heat from fires should be cooled with large quantities of water.
Extinguishing Media	: Alcohol-resistant foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	: Do not use water in a jet.
Protective Equipment for Firefighters	: Wear full protective clothing and self-contained breathing apparatus.
Other Advice	: Evacuate the area of all non-essential personnel. Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment Emergency Procedures	: Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet.
Environmental Precautions	: Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Use appropriate containment to avoid environmental contamination. Ventilate contaminated area thoroughly.
Methods and material for containment and clean	: Contain run-off from residue flush and dispose of properly. Soak up residue with an absorbent such as clay, sand or other suitable material. For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum

	truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Transfer to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste.
Additional Advice	: See Chapter 13 for information on disposal. Observe all relevant local regulations. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Dike and contain spill water.

7. HANDLING AND STORAGE

General Precautions	: Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. On guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Precautions for safe Handling	: Use local exhaust extraction over processing area. Handle and open container with care in a well-ventilated area. Do not empty into drains. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Handling Temperature: Ambient. 60 °C maximum.
Conditions for safe Storage	
Conditions for safe Storage	: Tanks must be clean, dry and rust-free. Keep container tightly closed. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Cleaning, inspection and maintenance of storage tanks is a specialist operation which requires the implementation of strict procedures and precautions. Drums should be stacked to a maximum of 3 high. Storage Temperature: Ambient. 60 °C maximum.
Product Transfer	: Keep containers closed when not in use. Do not pressurize drum containers to empty.
Recommended Materials	: Stainless steel. Mild steel. Carbon steel
Other Advice	: Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this
Ethylene Glycol Antifreeze Grade

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Ethylene Glycol	ACGIH	Ceiling		100 mg/m3	
Aerosol.					

	SG PEL	STEL	50 ppm	127 mg/m3	

Additional Information : Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use.

Material Source Hazard Designation

Material	Source	Hazard Designation
Ethylene Glycol	ACGIH	Not classifiable as a human carcinogen.

Biological Exposure Index (BEI) - See reference for full details

No biological limit allocated.

Appropriate Engineering Controls : No exposure controls are ordinarily required under normal conditions of use. It is good general industrial hygiene practice to minimize exposure to the material.

Individual protection Measures : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air filtering
respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN14387 (AS/NZS:1716).

Hand Protection : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739, AS/NZS:2161) made from the following materials may provide suitable chemical protection: Longer term protection: PVC. Neoprene rubber. Nitrile rubber. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Ethylene Glycol Antifreeze Grade

Eye Protection : Chemical splash goggles (chemical mono goggles).

Body protection : Skin protection not ordinarily required beyond standard issue work clothes. Chemical resistant gloves/gauntlets, boots, and apron.

Thermal hazards : Not applicable

Monitoring Methods : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to

	confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Examples of sources of recommended air monitoring methods are given below or contact supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods, http://www.cdc.gov/niosh/nmam/nmammenu.html. Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods, http://www.oshaslc.gov/dts/sltc/methods/toc.html. Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances, http://www.hsl.gov.uk/publications/mdhs.aspx. Berufsgenossenschaftliches Institut für Arbeitssicherheit (BIA), Germany http://www.hvbg.de/d/bia/index.html. L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/securite/hygiene_securite_travail.html.
Environmental Exposure Controls	: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Exhaust emission systems should be designed in accordance with local conditions; the air should always be moved away from the source of vapour generation and the person working at this point. Eye washes and showers for emergency use. Firewater monitors and deluge systems are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Colourless Slightly viscous liquid.
Odour	: Mild
Odour threshold	: 25 ppm
pH	: Not applicable
Boiling point	: 190 - 240 °C / 374 - 464 °F
Melting / freezing point	: Data not available.
Flash point	: 121 °C / 250 °F(ASTM D-93 / PMCC)
Explosion / Flammability limits in air	: Data not available.
Auto-ignition temperature	: Data not available.
Flammability (solid, gas)	: Data not available.
Vapour pressure	: Data not available.
Relative Density	: 1.12
Density	: Data not available.
Water solubility	: Completely Soluble
Solubility in other solvents	: Data not available.
n-octanol/water partition coefficient (log Pow)	: Data not available.
Decomposition temperature	: Note: Stable under normal conditions of use., Reacts with strong oxidising agents.
Dynamic viscosity	: Data not available.
Kinematic viscosity	: Data not available.
Vapour density (air=1)	: 2.1
Stability	: Stable.

Evaporation rate (nBuAc=1) : Data not available.
Surface tension : Data not available.

10. STABILITY AND REACTIVITY

Chemical stability : Stable under normal conditions of use. Reacts with strong oxidising agents.
Conditions to Avoid : High Temperature.
Incompatible materials : Strong oxidising agents. Strong acids. Strong bases.
Hazardous Decomposition Products : Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Possibility of hazardous reactions : Data not available.

Sensitivity to Static Discharge : Data not available

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11. TOXICOLOGICAL INFORMATION

Information on Toxicological effects

Basis for Assessment : Information given is based on product testing, and/or similar products, and/or components.
Likely routes of exposure : Skin and eye contact are the primary routes of exposure although exposure may occur through inhalation or following accidental ingestion.
Acute Toxicity

Acute Oral Toxicity : Harmful if swallowed. LD50 >300 - <=2000 mg/kg
There is a marked difference in acute oral toxicity between rodents and man, man being more susceptible than rodents. The estimated fatal dose for man is 100 millilitres (1/2 cup). This material has also been shown to be toxic and potentially lethal by ingestion to cats and dogs.
Acute Dermal Toxicity : Expected to be of low toxicity: LD50 >5000 mg/kg
Acute Inhalation Toxicity : Low toxicity if inhaled.
Skin corrosion/irritation : Slightly irritating to skin.
Serious eye damage/irritation : Slightly irritating to the eye.
Respiratory Irritation : Inhalation of vapours or mists may cause irritation to the respiratory system.
Respiratory or skin sensitization : Not expected to be a sensitiser.
Aspiration hazard : Not considered an aspiration hazard.
Germ cell mutagenicity : No evidence of mutagenic activity.
Carcinogenicity : Not carcinogenic in animal studies.
Reproductive and : Does not impair fertility.

Developmental Toxicity

	Not a developmental toxicant. Causes feto toxicity in animals; considered to be secondary to maternal toxicity.
Specific target organ toxicity - single exposure	: Kidney: can cause kidney damage. Ingestion may cause drowsiness and dizziness. Inhalation of vapours or mists may cause irritation to the respiratory system.
Specific target organ toxicity – repeated exposure	: Kidney: can cause kidney damage.

12. ECOLOGICAL INFORMATION

Basis for Assessment	: Information given is based on product testing.
Acute Toxicity	
Fish	: Practically non toxic: LC/EC/IC50 > 100 mg/l
Aquatic Invertebrates	: Practically non toxic: LC/EC/IC50 > 100 mg/l
Algae	: Practically non toxic: LC/EC/IC50 > 100 mg/l
Microorganisms	: Practically non toxic: LC/EC/IC50 > 100 mg/l
Mobility	: Dissolves in water. If product enters soil, one or more constituents will be mobile and may contaminate groundwater.
Persistence/degradability	: Readily biodegradable.
Bioaccumulative potential	: Does not bioaccumulate significantly.
Other Adverse Effects	: Data not available.

13. DISPOSAL CONSIDERATIONS

Material Disposal	: Recover or recycle if possible. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Remove all packaging for recovery or waste disposal. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.
Container Disposal	: Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation	: Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

Land (as per ADR classification): Not regulated
This material is not classified as dangerous under ADR regulations.
IMDG
This material is not classified as dangerous under IMDG regulations.
IATA (Country variations may apply)

This material is either not classified as dangerous under IATA regulations or needs to follow country specific requirements.

Sea (Annex II of MARPOL 73/78 and the IBC code)

Pollution Category	**:** Y
Ship Type	**:** 3
Product Name	**:** Ethylene glycol
Special Precaution	**:** Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	**: This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.**

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Local Regulations

Workplace Safety and Health Act & Workplace Safety and Health Provision) Regulations Environmental Protection and Management Act and	: This product is subject to the SDS, Labelling, PEL and other requirements in the Act/ Regulations. : This product is not subject to control under this Act/ Regulation. (General **Ethylene Glycol Antifreeze Grade**
Environmental Protection and Management (Hazardous Substances) Regulations	: This product is not subject to control under this Act/ Regulation.
Maritime and Port Authority of Singapore (Dangerous Goods, Petroleum and Safety (Petroleum & Flammable Materials) Regulations	: This product is not subject to control under this Act/ Regulation.
Fire Safety Act and Fire Safety (Petroleum & Flammable Materials)	: This product is not subject to control under this Act/ Regulation.

Chemical Inventory Status

AICS	: Listed.
DSL	: Listed.
INV (CN)	: Listed.
ENCS (JP)	: Listed. (2)-230
TSCA	: Listed.
EINECS	: Listed. 203-473-3
KECI (KR)	: Listed. KE-13169

PICCS (PH)	: Listed.
ISHL (JP)	: Listed. (2)-230
NZIOC	: Listed.

16. OTHER INFORMATION

GHS Hazard statements
H302 Harmful if swallowed.
H373 May cause damage to organs or organ systems through prolonged or repeated exposure.

MSDS Version Number	: 3.
MSDS Effective Date	: 29 Jan 2021
MSDS Revisions	: A vertical bar (|) in the left margin indicates an amendment from the previous version.
Uses and Restrictions	: Keep out of reach of children and pets. Do not use in the manufacture or preparation of foods or pharmaceuticals. Do not use in theatrical fogs or other artificial smoke generator applications. Do not use in aircraft deicing applications.
MSDS Distribution	: The information in this document should be made available to all who may handle the product
Disclaimer	: This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.