



SAFETY DATA SHEET(SDS)

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Ethylene Glycol

1. IDENTIFICATION

A. Product name : **Ethylene Glycol C1-MEG**

B. Recommended use : Polyester textile, antifreezing solution, manufacture of urethane,
Unsaturated polyester
restriction on use : Prohibition of use other than the recommended purpose.

C. Manufacturer / Supplier / Distributor information :

1) Manufacturer information :

Company name	Hanwha TotalEnergies Co.,Ltd		
Address	103, Dokgot 2-ro, Daesan-Up, Seosan, Chungnam, Korea, 356-711		
Telephone number	+82-41-660-6392	Fax number	+82-41-660-6457

2) Supplier/Distributor information :

Company name	Hanwha TotalEnergies Co.,Ltd		
Address	17~20F Hanwha Finance Plaza, 92, Sejong-daero, Jung-gu, Seoul 04525, Korea		
Telephone number	+82-2-3415-9372	Fax number	+82-2-3415-9370

3) Writer information :

Department	Safety & Health Planning Team		
Telephone number	+82-41-660-6366,	Fax number	+82-41-660-6348
number	6382		

2. HAZARD IDENTIFICATION

A. GHS Classification:

1) Physical hazards : Not Classified

2) Health hazards

- Acute toxicity (oral) : Category4
- Skin corrosion/irritation : Category2
- Serious eye damage/irritation : Category2A
- Specific target organ toxicity(Single exposure) : Category2
- Specific target organ toxicity(Single exposure) : Category3(Respiratory tract irritation)
- Specific target organ toxicity(Repeated exposure) : Category2

3) Environmental hazards : Not Classified

B. GHS label elements

1) Hazard symbols :



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2) Signal words : Warning

3) Hazard statements :

- H302 Harmful if swallowed
- H315 Causes skin irritation
- H319 Causes serious eye irritation
- H335 May cause respiratory irritation.
- H371 May cause damage to organs(Central nervous system, kidney, metabolic acidosis)
- H373 May cause damage to organs(Kidney) through prolonged or repeated exposure.

4) Precautionary statements :

■ Prevention

- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
- P264 Wash hands thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

■ Response

- P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308+P311 If exposed: Call a POISON CENTER or doctor/physician.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P314 Get medical advice/attention if you feel unwell.
- P321 Specific treatment
- P330 Rinse mouth.
- P332+P313 If skin irritation occurs: Get medical advice/attention.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P362+P364 Take off contaminated clothing and wash before reuse.

■ Storage

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.



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■ Disposal

- P501 Dispose of contents/container in accordance with local/ regional/ national/ international regulation

C. Other hazards which do not result in classification : (NFPA Classification)

- Not available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Ethylene Glycol	1,2-DIHYDROXYETHANE	107-21-1	100

4. FIRST AID MEASURES

A. Eye contact :

- Flush thoroughly with water at least 15minutes.
- Get medical assistance.
- Do not rub your eyes.

B. Skin contact :

- Wash contact areas with soap and water.
- Remove contaminated clothing and shoes.
- Get medical aid if irritation develops and persists.
- Wash clothing before reuse.
- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wear gloves when washing the patient, and please avoid contact with contaminated clothing.

C. Inhalation contact :

- If inhaled, remove to fresh air.
- If not breathing give artificial respiration.
- Get medical aid.
- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.

D. Ingestion contact :

- Potential for aspiration if swallowed. Get medical aid immediately.
- Do not induce vomiting unless directed to do so by medical personnel.



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- Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
- Rinse your mouth with water immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure:

1) Inhalation

- Short term exposure : irritation, sleepiness, headache, dizziness, blood disorder
- Long term exposure : irritation, headache

2) Skin contact

- Short term exposure : vomiting, gastralgia, headache, dizziness, sleepiness, hallucination, convulsions, coma, allergic reaction
- Long term exposure : irritation, allergic reaction

3) Eye contact

- Short term exposure : irritation
- Long term exposure : Not available

4) Ingestion

- Short term exposure : vomiting, gastralgia, headache, dizziness, sleepiness, hallucination, convulsions, coma
- Long term exposure : kidney trouble

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.
- Support vital functions, correct for dehydration and shock, and manage fluid balance.
- Administer ethanol (orally or by IV (intravenously)) or fomepizole (4-methylpyrazole or Antizol)) therapy by IV as an antidote to inhibit the formation of toxic metabolites.
- Notify medical personnel of contaminated situations and have them take appropriate protective measures.
- If exposed or concerned, get medical attention/advice.


5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media :

- 1) Suitable extinguishing media : Alcoholstable foam, dry chemical powder, carbon dioxide
- 2) Unsuitable extinguishing media: Avoid use of water jet for extinguishing.
- 3) In case of large fire : Do use extinguishing media with water spray or fog.

B. Specific hazards arising from the chemical

- Slightly flammable to flammable in presence of open flames and sparks, of heat.

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- Non-flammable in presence of shocks.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Mists containing combustible materials may be explosive.
- Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.
- Hazardous combustion product : Carbon oxides (carbon monoxide (CO), carbon dioxide (CO₂))

C. Special protective actions for firefighters :

- Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Using a unattended and water devices in case of large fire and leave alone to burn if you do not imperative.
- Avoid inhalation of materials or combustion by-products.
- Do not access if the tank on fire.
- Use appropriate extinguishing measure suitable for surrounding fire.
- Vapor or gas is burned at distant ignition sources can be spread quickly.
- Prevent, by any means available, spillage from entering drains or water course
- Use water delivered as a fine spray to control fire and cool adjacent area.
- DO NOT approach containers suspected to be hot.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures :

- Shut off all sources of ignition.
- Wear self-contained breathing apparatus.
- Ventilate closed spaces before entering.
- Do not touch spilled material. Stop leak if you can do it without risk.
- Handling the damaged containers or spilled material after wearing protective equipment.
- Do not direct water at spill or source of leak.
- Keep unauthorized people away, isolate hazard area and deny entry.

B. Environmental precautions :

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

C. Methods and materials for containment and cleaning up :

- 1) Small spillages



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- Use a non-combustible material like sand to soak up the product and place into a container for later disposal.
 - Stay upwind and keep out of low areas.
 - Dike for later disposal.
 - Notification to central government, local government. When emissions at least of the standard amount
 - Dispose of waste in accordance with local regulation.
 - Appropriate container for disposal of spilled material collected.
- 2) Large spillages
- Sand or other non-combustible material, please let use absorption.
 - Wipe off the solvent.
 - Dike for later disposal.
 - Spilled material should be treated as a potential risk of waste collected

7. HANDLING AND STORAGE


A. Precautions for safe handling :

- Keep away from heat.
- Keep away from sources of ignition.
- Empty containers pose a fire risk, evaporate the residue under a fume hood.
- Ground all equipment containing material.
- Do not ingest.
- Do not breathe gas/fumes/vapor/spray.
- Wear suitable protective clothing.
- If ingested, seek medical advice immediately and show the container or the label.
- Keep away from incompatibles such as oxidizing agents, acids, alkalis.
- Comply with all applicable laws and regulations for handling
- Dealing only with a well-ventilated place.
- Do not inhale the steam prolonged or repeated.
- Contaminated work clothing should not be allowed out of the workplace.

B. Conditions for safe storage, including any incompatibilities :

- Keep container tightly closed. Keep container in a cool, well-ventilated area.
- Save applicable laws and regulations.
- Do not apply any physical shock to container.
- Please pay attention to incompatibilities materials and conditions to avoid.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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A. Exposure limits:

- ACGIH TLV : TWA 25 ppm, STEL 50 ppm (10 mg/m³)
- OSHA PEL : Not applicable

B. Engineering controls :

- Adequate ventilation(localize ventilation) should be provided in workplaces.
- Use non sparking tools.
- A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits.
- Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.
- The use of local exhaust ventilation is recommended to control emissions near the source.

C. Individual protection measures, such as personal protective equipment :

1) Respiratory protection :

- Prevent inhalation of the solvents.
- If required to control exposure, use only suitable respirators and components tested and approved under appropriate government standards such as NIOSH.
- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
- Respiratory protection is ranked in order from minimum to maximum.
- Consider warning properties before use.
- Any chemical cartridge respirator with organic vapor cartridge(s).
- Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).
- Any air-purifying respirator with a full facepiece and an organic vapor canister.
- For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
- Any self-contained breathing apparatus with a full facepiece.

2) Eye protection

- Wear approved chemical safety glasses or goggles where eye exposure is reasonably probable.
- Eye wash fountain is recommended.

3) Hand protection – Wear protective gloves. Butyl rubber gloves are recommended.


4) Skin protection – Wear appropriate chemical resistant protective clothing.

5) Others : Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance : Colorless liquid

B. Odor: Odorless

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- C. Odor threshold : Not available
- D. pH : Not available
- E. Melting point/Freezing point : -12°C
- F. Initial Boiling Point/Boiling Ranges : 198°C
- G. Flash point: 111 °C (1,013.25 hPa)
- H. Evaporation rate : < 0.01
- I. Flammability(solid, gas) : Not applicable
- J. Upper/Lower Flammability or explosive limits: 3.2~15.3%
- K. Vapor pressure: 0.05mmHg (20°C)
- L. Solubility : Soluble, 1,000 g/l (20 °C) (Water)
- M. Vapour density(Air=1) : 2.1
- N. Specific gravity(Relative density) : 1.11 g/cm³ (20 °C)
- O. Partition coefficient of n-octanol/water : log Kow= -1.36
- P. Autoignition temperature : 398°C (1,013.25 hPa)
- Q. Decomposition temperature: Not available
- R. Viscosity : 21cP (15°C)
- S. Molecular weight : 62.068

10. STABILITY AND REACTIVITY

- A. Chemical Stability :
 - Stable under normal temperatures and pressures.
- B. Possibility of hazardous reactions :
 - Has not been reported.
- C. Conditions to avoid : Ignition source, excess heat, flame
- D. Incompatible materials :
 - Oxidizing agents, acid, metal, alkalis.
 - Glycols and their ethers undergo violent decomposition in contact with 70% perchloric acid.
 - This seems likely to involve formation of the glycol perchlorate esters (after scission of ethers) which are explosive, those of ethylene glycol and 3-chloro-1,2-propanediol being more powerful than glyceryl nitrate, and the former so sensitive that it explodes on addition of water.
- E. Hazardous decomposition products : Hydrocarbon compounds, Carbon oxides(carbon monoxide (CO), carbon dioxide (CO₂))



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11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

- Respiratory tracts : May cause respiratory irritation.
- Oral : Harmful if swallowed
- Eye·Skin :
 - Causes serious eye irritation
 - Causes skin irritation

B. Delayed and immediate effects and also chronic effects from short and long term exposure

1) Acute toxicity :

- * Oral : Category4
 - LD50 300~2000 mg/kg (EU Harmonized Cat. 4) (ECHA)
- * Dermal : Not classified
 - LD50 >3500 mg/kg Mouse (ECHA)
- * Inhalation : Not classified
 - Aerosol LC50 >3.75 mg/l 4 hr (>2.5 mg/l 6 hr) (Rat, GLP) (ECHA)

2) Skin corrosion/irritation : Category2

- Topical application of pure ethylene glycol does not irritate excised skin. (Clark et al., 1979). Intradermal injection guinea pigs have been reported to cause local skin irritation. Causes redness. Rabbit skin LD50 reported as 9530 mg/kg. (Cavender and Sowinski, 2001). Rabbit, guinea pig. (ACGIH, ICSC, BASF-internal standards)

3) Serious eye damage/irritation : Category2A

- Severe eye irritation was observed in rabbits after 90 days of continuous exposure at 2 mg/m³ (4.7 ppm), and corneal damage with apparent blindness was reported in 2 out of 15 rats after 8 days of exposure. Exposure causes eye pain and redness. (ACGIH, ICSC)

4) Respiratory sensitization : Not classified

- Not available

5) Skin sensitization: Not classified

- Non-sensitizing. (Guinea pig, GLP) (ECHA)

6) Carcinogenicity : Not classified


- ACGIH - A4
- IARC, OSHA, NTP, EU CLP - Not available

7) Germ cell mutagenicity : Not classified

- In vitro - Negative (S. typhimurium, Bacterial reverse mutation assay, GLP) (ECHA)
- In vivo - Negative (Rat, Rodent dominant lethal assay) (ECHA)

8) Reproductive toxicity : Not classified

- (Oral) No reproductive toxicity was observed as a result of exposure at concentrations of 40, 200, and 1,000 mg/kg. (Rat) (ECHA)

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- 9) STOT–single exposure : Category2(Central nervous system, kidney, metabolic acidosis), Category3(Respiratory tract irritation)
- Exposure may cause effects on the central nervous system and kidneys. It may cause depression, poisoning, euphoria, numbness and respiratory depression according to central nervous system stimulation, and may cause nausea and vomiting due to intestinal stimulation. Exposure to severe concentrations may cause coma, loss of reflexes, seizures (uncommon) and irritation of brain lining tissue. (Target organs : Central nervous system, kidney, metabolic acidosis) (Category2 Exposure to low concentrations causes coughing and moderate concentrations Category3(Respiratory tract irritation)) (ICSC, NIOSH)
- 10) STOT–repeated exposure : Category2(kidney)
- (Oral) As a result of exposure at concentrations of 50, 150, 300, and 400 mg/kg, renal accumulation of oxalate was observed, increasing the sensitivity to be an evaluation factor for hazard classification. (Rat, 1yr) (ECHA)
- 11) Aspiration hazard : Not classified
- Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity :

- Acute aquatic toxicity : Not classified
 - Chronic aquatic toxicity : Not classified
- 1) Fish :
- LC50> 72,860 mg/l (Pimephales promelas, 96hr) (ECHA)
 - NOEC= 15,380 mg/l (Pimephales promelas, 7d) (ECHA)
- 2) Crustaceans :
- EC50> 100 mg/l (*Daphnia magna*, 48hr, GLP) (ECHA)
 - NOEC≥ 1,000 mg/l (Read-across) (*Daphnia magna*, 23d) (ECHA)
- 3) Algae :
- EC50> 6,500, < 13,000 mg/l (Read-across) (*Pseudokirchneriella subcapitata*, 96hr) (ECHA)


B. Persistence and degradability:

- 1) Persistence : log Pow= -1.36 (ECHA)
- 2) Degradability : Not available

C. Bioaccumulative potential :

- 1) Bioaccumulative potential : BCF= 0.21~0.61 (HSDB)
- 2) Biodegradation : Readily biodegradable, (10d, GLP) (ECHA)

D. Mobility in soil :

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– Koc= 1 (Estimate) (ECHA)

E. Other adverse effects : Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- Dispose in accordance with all applicable regulations.
- Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.
- If water separation is possible, pre–process with Water separation process.
- Dispose by incineration.
- Will be pre–processed by the separation of oil and water.

B. Special precautions for disposal

- The user of this product must disposal by oneself or entrust to waste disposer or person who other’s waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG CODE/IATA DGR) : Not applicable

B. Proper shipping name : Not applicable


C. Hazard Class : Not applicable

D. IMDG CODE/IATA DGR Packing group : Not applicable

E. Marine pollutant : Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : Not available
- EmS SPILLAGE SCHEDULE : Not available

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15. REGULATORY INFORMATION

A. National and/or international regulatory information :

- POPs Management Law : Not applicable
- Information of EU Classification
 - * Classification : H302
- U.S. Federal regulations
 - * OSHA PROCESS SAFETY (29CFR1910.119) : Not applicable
 - * CERCLA Section 103 (40CFR302.4) : 2267.995 kg 5000 lb
 - * EPCRA Section 302 (40CFR355.30) : Not applicable
 - * EPCRA Section 304 (40CFR355.40) : Not applicable
 - * EPCRA Section 313 (40CFR372.65) : Applicable
- Rotterdam Convention listed ingredients : Not applicable
- Stockholm Convention listed ingredients : Not applicable
- Montreal Protocol listed ingredients : Not applicable

16. OTHER INFORMATION

A. Reference:

- EU Regulation 1272/2008
- TOMES; LOLI ; <http://csi.micromedex.com/fraMain.asp?Mnu=0>
- UN Recommendations on the transport of dangerous goods 17th
- IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
<http://monographs.iarc.fr>
- ECHA CHEM; <http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances>
- OECD SIDS; <http://webnet.oecd.org/Hpv/UI/Search.aspx>
- HSDB; <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2>

B. Key acronyms

- ACGIH(American Conference of Governmental Industrial Hygienists)
- ECHA(European Chemicals Agency)
- OECD(Organization for Economic Co-operation and Development)
- CERCLA(Comprehensive Environmental Response, Compensation, and Liability Act)
- IARC(International Agency for Research on Cancer)
- OSHA(Occupational Safety and Health Administration)
- NTP(National Toxicology Program)
- NFPA(National Fire Protection Association)
- LC₅₀(Lethal Concentration 50% kill)



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- LD₅₀(Lethal Dose 50% kill)
- EC₅₀(50% Effect Concentration)
- STEL(Short Term Exposure Limit)
- TWA(Time weight Average)
- TLV(Threshold Limit Value)

C. Issue date : 2010-07-27

D. Revision number and Last date revised : Rev.6, 2022-10-21
- Rev5 : Change company name and logo
- Rev6 : Change GHS classification and transport information

E. Other :

- This SDS is prepared according to the Globally Harmonized System (GHS).