SAFETY DATA SHEET

1. Product and Company Identification

Product Name: Inhibited Ethylene Glycol
Product Code: EGF05R, EGF55R **Chemical Type: Solvent Blend**
Product Use: Inhibited Ethylene Glycol coolant.

Manufacturer: Plastic Process Equipment Inc.
Address: 8303 Corporate Park Dr.
Macedonia, Ohio 44056
Revision Date: 12/11/2014
Emergency: (800)424-9300
Phone: (800) 362-0693

2. Hazards Identification

Classification of the substance or mixture:
Acute Oral Toxicity - Category 4
Specific target organ toxicity (repeated exposure) - Category 2

SIGNAL WORD: WARNING

Hazard Statement(s):
H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary Statement(s):
Prevention:
P260 Do not breathe mist / vapors / spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
Response:
P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330 Rinse mouth.
P314 Get medical advice/attention if you feel unwell.
Storage:
No storage statements.
Disposal:
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazards
Slightly combustible. Harmful or fatal if swallowed. Swallowing this material will result in serious health hazard, potentially leading to collapse and death. Ingestion may result in irritation of the mouth and digestive tract. May be irritating to the eyes, skin, and respiratory system.

Odor/Appearance: Green liquid

Potential health effects

Routes of exposure: Skin, eyes, inhalation, ingestion.

Signs and Symptoms of Acute Exposure See component summary.
• ***1,2-Ethanediol 107-21-1***
Ingestion hazard. Ingestion may include inebriation, nausea and vomiting, metabolic acidosis, and CNS depression. Cardiopulmonary effects including tachycardia, hypertension, severe metabolic acidosis with hyperventilation, hypoxia, congestive heart failure and adult respiratory distress syndrome, as well as, renal failure are also possible. May also produce a local irritation effect on the digestive system, and cause pain and bleeding. Irritation of the eyes and respiratory system. Effects of eye irritation are reversible. High aerosol concentrations may cause respiratory irritation. Mildly irritating to the skin but not a skin sensitizer. Not a skin absorption hazard.

• ***Diethylene glycol 111-46-6***
This substance may cause effects on the central nervous system, liver and kidneys.
Skin
May be mildly irritating to the skin. Not a sensitizer. Not expected to be a skin absorption hazard.
Inhalation
High aerosol concentrations may cause respiratory irritation.
Eye
May cause mild eye irritation. Effects of eye irritation are reversible.
Ingestion
Ingestion may include inebriation, nausea and vomiting, metabolic acidosis, and CNS depression. Cardiopulmonary effects including tachycardia, hypertension, severe metabolic acidosis with hyperventilation, hypoxia, congestive heart failure and adult respiratory distress syndrome, as well as, renal failure are also possible. May also produce a local irritation effect on the digestive system, and cause pain and bleeding.

Chronic Health Effects
See component summary.
• ***1,2-Ethanediol 107-21-1***
Repeated or prolonged exposure may result in kidney damage. May produce symptoms of central nervous system depression including headache, dizziness, nausea, euphoria, loss of equilibrium, drowsiness, visual disturbances, fatigue, unconsciousness and respiratory arrest.
• ***Diethylene glycol 111-46-6***
No adverse chronic human health effects have been reported for this material.

Conditions Aggravated by Exposure
Exposure may aggravate one or more of the following medical conditions: Kidney disease. Skin contact may aggravate an existing dermatitis. May cause central nervous system depression.

3. Composition / Information on Ingredients

Component Name	CAS #	EU Inventory	Concentration Wt.%
1,2-Ethanediol	107-21-1	203-473-3	>95%
Diethylene glycol	111-46-6	203-872-2	<= 5.0
Water	7732-18-5	231-791-2	<= 1.0

4. First Aid Measures

General
Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. For specific information refer to the Emergency Overview in Section 3 of this MSDS.
Skin
Remove contaminated clothing and wash skin with plenty of soap and water. Flush with lukewarm water for 15 minutes. If sticky, use waterless cleaner first. Seek medical attention if ill effect or irritation develops.
Inhalation
If overcome by exposure, remove victim to fresh air immediately. If breathing is difficult, give oxygen. Obtain medical attention if breathing difficulty persists.

Eye
Thoroughly flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation persists, seek medical attention.
Ingestion
DO NOT induce vomiting. If vomiting does occur, have victim lean forward to reduce risk of aspiration. Obtain emergency room treatment immediately.
Note to Physician
Principal effects produced by Ethylene Glycols, especially by acute overexposure from swallowing the liquid, are kidney injury and metabolic acidosis. Treatment of metabolic acidosis, administration of ethanol, and hemodialysis may be indicated. Hemodialysis may be indicated for more complete elimination.

5. Fire Fighting Measures

Flammable Properties
Classification
OSHA/NFPA Class IIIA Combustible Liquid.

Flash Point: 116 °C (240.8 °F) PMCC
Auto-Ignition Temperature 398 °C (748.4 °F)
Lower Flammable Limit 3.2 vol% **Upper Flammable Limit** 15.3 vol%

Extinguishing Media
Suitable: SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam. LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.
Unsuitable: Even if material is water soluble, may not be practical to extinguish fire by water dilution.

Protection of Firefighters
Protective Equipment/Clothing: Wear an approved positive pressure self-contained breathing apparatus and firefighter turnout gear. Structural firefighters protective clothing will only provide limited protection.
Fire Fighting Guidance: Ethylene glycol mist in air is a moderate fire and explosion hazard. Individuals should perform only those fire-fighting procedures for which they have been trained. Fire fighters should wear self-contained breathing apparatus in the positive pressure mode with a full facepiece when there is a possibility of exposure to smoke, fumes or hazardous decomposition products. Cool tanks and containers exposed to fire with water. Cool containers with flooding quantities of water until well after fire is out.
Hazardous Combustion Products: Carbon oxides (CO, CO2)

6. Accidental Release Measures

Release Response
Eliminate all sources of ignition. All equipment used when handling this product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. For large spills, dike and pump into properly labeled containers for reclamation or disposal. For small spills, soak up with absorbent material and place in properly labeled containers for disposal. Report spills or leaks to the proper regulatory authorities.

7. Handling and Storage

FOR INDUSTRIAL USE ONLY. KEEP OUT OF REACH OF CHILDREN
Handling
Avoid open heating or agitation that may generate vapors or mists. Do not handle near heat, sparks, or flame. Avoid contact with incompatible agents. Use only with adequate ventilation/personal protection. Avoid contact with eyes, skin and clothing. Do not enter storage area unless adequately ventilated. Metal

containers involved in the transfer of this material should be grounded and bonded. Containers, even those that have been emptied, will retain product residue and vapor and should be handled as if they were full. Do not eat, drink or smoke in areas where this material is used.

Storage
Store containers in a cool, dry, ventilated, fire resistant area away from sources of ignition and incompatible materials. Ground all equipment containing this material. Keep container tightly closed and properly labeled.

8. Exposure Controls / Personal Protection

Personal Protection

Inhalation
A respiratory protection program that meets OSHA's 29 CFR 1910.134 or ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use. Where unknown concentrations are encountered or during an emergency, use NIOSH approved supplied air respirators.

Skin
Wear chemical resistant gloves such as rubber, neoprene or vinyl. Appropriate protective clothing should be worn to prevent skin contact. The equipment must be cleaned thoroughly after each use.

Eye
Safety glasses are recommended for normal use. Use splash goggles when eye contact due to splashing or spraying liquid is possible.

Additional Remarks
Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse. Shower after work using plenty of soap and water.

Engineering Controls:
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Use a NIOSH approved respirator if ventilation is not adequate to maintain exposures below TLV levels.

Respiratory Protection*:*

Based on workplace contaminant level and working limits of the respirator, use a respirator approved by NIOSH. The following is the minimum recommended equipment for an occupational exposure level.

For concentrations > 1 and < 10 times the occupational exposure level: Use air-purifying respirator with full facepiece and organic vapor cartridge(s) or air-purifying full facepiece respirator with an organic vapor canister or a full facepiece powered air-purifying respirator fitted with organic vapor cartridge(s). The air purifying element must have an end of service life indicator, or a documented change out schedule must be established. Otherwise, use supplied air.

For escape: Use self-contained breathing apparatus with full facepiece or any respirator specifically approved for escape.

Discretion Advised:

Plastic Process Equipment, Inc. takes no responsibility for determining what measures are required for personal protection in any specific application. The general information should be used with discretion.

Exposure guidelines:

Occupational Exposure Limits

Component Name	Source / Date	Value	Type	Notation
1,2-Ethanediol	US (ACGIH)	100 mg/m3 Aerosol	CEILING	
	US (OSHA)	N/L		
Diethylene glycol	US (ACGIH)	N/L		
	US (OSHA)	N/L		

9. Physical and Chemical Properties

Appearance: Viscous liquid. Clear, Green
Odor: Slight sweet odor.
Odor Threshold: No Data Available.
pH: Not applicable.
Boiling Point/Boiling Range: 197.5 °C (387.5 °F)
Freezing Point/Melting Point: -13 °C (8.6 °F) Freezing Point. -15.6 °C (3.92 °F) Melting point.
Flash Point: 116 °C (240.8 °F) PMCC
Auto-ignition: 398 °C (748.4 °F)
Flammability: OSHA/NFPA Class IIIA Combustible Liquid.
Lower Flammable Limit: 3.2 vol%
Upper Flammable Limit: 15.3 vol%
Explosive Properties: No Data Available.
Oxidizing Properties: No Data Available.
Vapor Pressure: 0.05 mm Hg @ 20 °C (68 °F)
Evaporation Rate: No Data Available.
Relative Density: 1.1135 @ 20 °C (68 °F) (Water = 1)
Relative Vapor Density: 2.14 (Air = 1.0)
Viscosity: No Data Available.
Solubility (Water): soluble in all proportions.
Partition Coefficient (Kow): Log Kow = -1.36
Additional Physical and Chemical Properties: Hygroscopic.

10. Stability and Reactivity

Chemical Stability
The product is stable.
Conditions to Avoid
Heat, sparks, open flames and strong oxidizing conditions.
Substances to Avoid
Strong oxidizer. Strong acids. Permanganates. Peroxides. Dichromates. Reactive sodium compounds. Sulfur compounds. Alkali metals. Nitrates.
Decomposition Products
Carbon Monoxide and Carbon dioxide.
Hazardous Polymerization
Hazardous polymerization will not occur.
Reactions with Air and Water
Does not react with air or water.

11. Toxicological Information

Product Summary
Monoethylene glycol (ethylene glycol) has low acute toxicity in experimental animals following oral, inhalation, or dermal exposure. Accidental or intentional acute ingestions in humans, however, have caused poisoning and death. High aerosol concentrations may cause respiratory irritation. Ethylene glycol is not

rapidly absorbed through skin. Repeated oral exposures of high doses may result in deposition of calcium oxalate crystals in the kidney resulting in kidney failure; however, human exposures at occupationally relevant concentrations are unlikely to cause this effect. Ethylene glycol is not expected to cause genotoxic, developmental, reproductive or carcinogenic effects in humans.

Other Information
Human acute toxicity has three recognized stages: Stage 1. (0.5 to 12 hours post ingestion) may include inebriation, nausea and vomiting, metabolic acidosis, and CNS depression. Stage 2. (12-24 hours) cardiopulmonary effects include tachycardia, hypertension, severe metabolic acidosis with hyperventilation, hypoxia, congestive heart failure and adult respiratory distress syndrome. Stage 3. (24-72 hours) renal failure. Ethylene glycol may also produce a local irritation effect on the digestive system, and cause pain and bleeding.

COMPONENT INFORMATION

• 1,2-Ethanediol 107-21-1

Acute Toxicity - Lethal Doses
LD50 (Oral) Rat 5890 - 13,400 MG/KG BWT
NOAEL Rabbit > 3549 MG/KG BWT (SKIN)
Irritation
Skin May be irritating to the skin. Not expected to be a sensitizer. No significant signs or symptoms indicative of any health hazard are expected to occur as a result of skin absorption exposure.
Eye May cause minor eye irritation. Effects of eye irritation are reversible.
Sensitization
Not expected to be a sensitizer.
Target Organ Effects
Central nervous system effects. Blood (metabolic acidosis). Respiratory system. Cardiovascular system. Kidneys.
Repeated Dose Toxicity
If exposures are sufficiently high to cause accumulation of calcium oxalate crystals, kidney pathology may occur. In male rats, crystal nephropathy has been seen after dietary administration of 500 mg/kg/day bwt for 16 weeks, whereas no effects were seen in rats that ingested 200 mg/kg/day bwt for 2 years or in several animal species that inhaled 12 mg/m3 for 3 months . Human exposures at occupational relevant concentrations are unlikely to cause crystal nephropathy.
Reproductive Effects
No evidence of adverse effects on reproductive organs or fertility in rats and rabbits have occurred from ethylene glycol exposure. Mice exposed to doses considerably higher than those associated with developmental effects or kidney effects in rats exhibited reduced number of litters and smaller litters. No reproductive effects expected from human exposures.
Developmental Effects
Doses of ethylene glycol that result in high levels of the metabolite glycolic acid induce developmental/teratogenic effects in rats and mice, although at doses greater than those associated with kidney effects in rats. Human exposure is not expected to generate sufficient levels of glycolic acid; therefore, no developmental effects are expected in humans.
Genetic Toxicity
Negative for genotoxicity both in vitro and in vivo tests.
Carcinogenicity
Ethylene glycol was not carcinogenic in two year studies in rats and mice. This material is not classified as a carcinogen. Not listed by IARC, NTP, or OSHA.

Human acute toxicity has three recognized stages: Stage 1. (0.5 to 12 hours post ingestion) may include inebriation, nausea and vomiting, metabolic acidosis, and CNS depression. Stage 2. (12-24 hours) cardiopulmonary effects include tachycardia, hypertension, severe metabolic acidosis with hyperventilation, hypoxia, congestive heart failure and adult respiratory distress syndrome. Stage 3. (24-72 hours) renal failure. Ethylene glycol may also produce a local irritation effect on the digestive system, and cause pain and bleeding.

• Diethylene glycol 111-46-6
Acute Toxicity - Lethal Doses
LD50 (Oral) Rat 12,600 MG/KG BWT
Mouse 23,700 MG/KG BWT
LD50 (Skin) Rabbit 11,900 MG/KG

Acute Toxicity - Effects
Inhalation May produce symptons of central nervous system depression including headache, dizziness, nausea, loss of sense of balance, drowsiness, visual disturbances, unconsciousness and sense of balance, drowsiness, visual dissturbances, unconsciousness and death.
Repeated Dose Toxicity
Diethylene glycol given to rats in the diet for two years caused bladder stones, tumors, and kidney and liver damage. These effects were probably due to contaminating ethylene glycol, and the bladder stones were formed from oxalate crystals.
Reproductive Effects
There are conflicting results in the literature about the reproductive effects of diethylene glycol in animals. It did not affect reproduction when given orally to rats, but another report stated that it may have affected either male or female fertility or both, because no pregnancies occurred when both sexes were exposed orally. Diethylene glycol had no effect on fertility at a level of 2.5% in the drinking water of mice. However, another preliminary study in mice concluded that it may be a suspect reproductive hazard.
Carcinogenicity
Not listed by IARC, NTP, or OSHA. No evidence for carcinogenicity was found with a chronic skin-painting study in mice. The absence of a direct chemical carcinogenic effect accords with the results in vitro genotoxicity studies which shows that it does not product mutagenic or clastogenic effects.

Potassium Hydroxide – trace in the inhibitor

Potassium Hydroxide	1310-58-3	NIOSH (TWA)- 2 mg/m3 ACGIH (CEILING)- 2 mg/m3

12. Ecological Information

Ecotoxicity
This material is expected to be non-hazardous to aquatic species. See component summary. Terrestrial plant and avian NOEC (No Observed Effect Concentration) data are available upon request.

Environmental Fate and Pathway
Mobile in soil. Not expected to volatilize from surface waters or soils. Not likely to adsorb to suspended solids and sediment in water. Environmental half-life of 0.35 to 24 days in soil, air, surface and ground water. Not expected to undergo hydrolysis. Undergoes photooxidation with hydroxyl radicals in air with a half-life of 8.3 to 83 hours.

Persistance and Degradability
Biodegradation: Biodegradable under aerobic conditions. See component summary.
Bioaccumulation: This material is not expected to bioaccumulate. See component summary.

COMPONENT INFORMATION

• 1,2-Ethanediol 107-21-1

Ecotoxicity
Terrestrial plant and avian NOEC (No Observed Effect Concentration) data are available upon request.
Acute toxicity to fish
LC50 / 96 HOUR rainbow trout. 22,810 mg/l
LC50 / 96 HOUR fathead minnow 49,000 mg/l
Summary: This material is not classified as harmful or toxic to fish.

Acute toxicity to aquatic invertebrates
EC50 / 48 HOUR Daphnia magna. 41,000 mg/l
EC50 / 48 HOUR daphnia 10,000 mg/l
Summary: This material is not classified as harmful or toxic to invertebrates.

Toxicity to aquatic plants
Toxicity Threshold / 7 DAY blue green algae. 2,000 mg/l
Summary: This material is not classified as harmful or toxic to algae or higher aquatic plants.

Toxicity to microorganisms
Toxicity Threshold / 16 HOUR bacteria. > 10,000 mg/l

Chronic toxicity to fish
LC50 / 12 DAY rainbow trout. 20,403 mg/l
Chronic toxicity to aquatic invertebrates
LC50 / 7 DAY daphnia 30,461 mg/l

Environmental Fate and Pathway

Mobile in soil. Not expected to volatilize from surface waters or soils. Not likely to adsorb to suspended solids and sediment in water. Environmental half-life of 0.35 to 24 days in soil, air, surface and ground water. Not expected to undergo hydrolysis. Undergoes photooxidation with hydroxyl radicals in air with a half-life of 8.3 to 83 hours.

Persistance and Degradability
Biodegradation: Reported biodegradation studies show ethylene glycol with 97% biodegradation after 20 days, and 96% biodegradation after 28 days. Biodegradable under aerobic conditions.
Bioaccumulation: BCF = 0.21 - 0.61 (crawfish) BCF = 10.0 (fish) This material is not expected to bioaccumulate.

• ***Diethylene glycol 111-46-6***

Ecotoxicity

Diethylene glycol (DEG) is highly soluble in water. Laboratory tests indicate that DEG is not significantly toxic to fish or aquatic invertebrates. While there is no wildlife toxicity data available on DEG, laboratory tests on rats would indicate that it should not be highly toxic to mammals.

Environmental Fate and Pathway

This material is volatile and water soluble. It is not expected to adsorb onto soils or sediments. Expected to have high mobility in soils. This material is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase is degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals. Particulate-phase of this material may be physically removed from the air by wet and dry deposition. This material is not expected to persist in the environment.
Persistance and Degradability
Stability in Water: Diethylene glycol (DEG) is highly soluble in water.
Biodegradation: This material is expected to be readily biodegradable.
Bioaccumulation: BCF < 1.0 This material is not expected to bioaccumulate.

13. Disposal Considerations

Dispose of all waste and contaminated equipment in accordance with all applicable federal, state and local health and environmental regulations. Recovery and reuse, rather than disposal, should be the ultimate goal of handling efforts. The materials resulting from clean-up operations may be hazardous wastes and therefore, subject to specific regulations. Comply with federal, state, or local regulations for disposal.

14. Transport Information

Proper Shipping Name Environmentally hazardous substance, liquid, n.o.s. (ETHYLENE GLYCOL)
RQ ETHYLENE GLYCOL SOLUTION
ID No. UN3082
Hazard Class 9
PG III

15. Regulatory Information

If identified components of this product are listed under the TSCA 12(b) Export Notification rule, they will be listed below.

SARA 302/304
This material contains a component(s) with known CAS numbers classified as hazardous substances subject to the reporting of CERCLA (40 CFR 302) and/or to the release reporting requirements of SARA (Section 302) based on reportable quantities (RQs).
Component RQ
Ethylene glycol CAS# 107-21-1 5,000 lbs

SARA 311/312
Based upon available information, this material is classified as the following health and/or physical hazards according to Section 311 & 312:
Immediate (Acute) Health Hazard. Delayed (Chronic) Health Hazard.

SARA 313
This material contains the following chemicals with known CAS numbers subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR 372:
Component Reporting Threshold
Ethylene glycol CAS# 107-21-1 1.0%

State Reporting
This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

16. Other Information

Hazard ratings This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

NFPA: Health: 1 Flammability: 1 Reactivity: 0

HMIS: Health: 2 Flammability: 1 Reactivity: 0
RATING: 4-EXTREME 3-HIGH 2-MODERATE 1-SLIGHT 0-INSIGNIFICANT

MSDS Prepared by: Technical Director

Note:
For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Plastic Process Equipment Inc makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. This material may be released from gas, liquid, or solid materials made directly or indirectly from it. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards. Possession of an MSDS does not indicate that the possessor of the MSDS was a purchaser or user of the subject product.