

Material Safety Data Sheet

Glycol Ether EE

Effective Date May 2005
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SECTION 1: IDENTIFICATION

Product Name: GLYCOL ETHER EE

Chemical Family: Glycol Ethers

CAS Number: 110-80-5

Chemical Name: 2-ethoxyethanol

Synonyms: Ethylene Glycol Monoethyl Ether, Cellosolve, Ethylene glycol ethyl ether

COMPANY: TRInternational, Inc.

1218 Third Avenue, Suite 2100

Seattle, WA 98101

206-505-3500

Emergency Contact: Infotrac 800-505-5053

SECTION 2 : COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component Name</u>	<u>CAS #</u>	<u>EU Inventory</u>	<u>Concentration Wt.%*</u>	
<u>Risk</u>	<u>Symbol</u>			
2-Ethoxyethanol	110-80-5	203-804-1	99.0 <= 99.9	R60,
R61, T Rep2, R10,R20/21/22				
1,2-Ethanediol	107-21-1	203-473-3	<= 0.5	R22
Xn				
Diethylene Glycol Monoethyl	111-90-0	203-919-7	<= 0.5	None
None				
Ether				
Water	7732-18-5	231-791-2	<= 0.2	None
None				

* Concentration of gaseous products or materials is given in Mole %
Compositions given are typical values not specifications.

SECTION 3: HAZARD IDENTIFICATION

Emergency Overview

This material is HAZARDOUS by OSHA Hazard Communication definition.

Signal Word

WARNING!

Hazards

Flammable liquid. Eye irritant. Mucous membrane irritant. Respiratory tract irritant. CNS depressant. May cause liver and/or kidney damage.

Physical State

Liquid.

Color

Clear

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Odor

Mild Sweetish Odor

Odor Threshold

2.7 ppm / (detectable) 6.5 ppm / (recognizable)

Potential Health Effects

Routes of Exposure

Inhalation Skin. Ingestion

Signs and Symptoms of Acute Exposure

See component summary.

- *2-Ethoxyethanol 110-80-5*

May be irritating to the eyes. Exposure to this material may cause respiratory irritation. This substance may cause effects on the central nervous system, liver and kidneys. This material may be absorbed through the skin. Not a skin irritant. Not expected to be a sensitizer.

- *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 Monoethyl Ether 111-90-0*

May be irritating to the eyes. Slight skin irritant.

Skin

May be absorbed in toxic amounts through the skin.

Inhalation

Vapor or mist is irritating to the respiratory tract.

Eye

May be irritating to the eyes.

Ingestion

May cause headache, dizziness, nausea, vomiting, gastrointestinal distress, liver and kidney injury.

Chronic Health Effects

See component summary.

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- *2-Ethoxyethanol 110-80-5*

Prolonged or repeated exposure may result in CNS and gastrointestinal system disturbance, and possible adverse reproductive effects. Excessive oral exposure may result in changes to the liver and testes. Repeated, prolonged, excessive exposure may result in kidney damage.

- *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 Monoethyl Ether 111-90-0*

Repeated or prolonged skin contact may cause slight transient irritation. Skin absorption may add significantly to the overall toxic effect.

Conditions Aggravated by Exposure

Any pre-existing conditions affecting target organs:

SECTION 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

Immediately remove excess chemical and contaminated clothing; thoroughly wash contaminated skin with mild soap and water. If irritation persists after washing, seek medical attention. Thoroughly clean contaminated clothing before reuse; discard contaminated leather goods (gloves, shoes, belts, wallets, etc.).

Inhalation

Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. When breathing is difficult, properly trained personnel may assist the affected person by administering oxygen. Keep the affected person warm and at rest. Get medical attention immediately.

Eye

Flush with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.

Ingestion

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Have patient drink several glasses of water then induce vomiting by having patient tickle back of throat with finger.

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SECTION 5: FIRE FIGHTING MEASURES

Flammable Properties

Classification

OSHA/NFPA Class II combustible liquid.

Flash Point:

43 °C (109.4 °F) closed cup

Auto-Ignition Temperature

235 °C (455 °F)

Lower Flammable Limit

1.8 vol%

Upper Flammable Limit

14 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: Do not use solid water stream.

Protection of Firefighters

Protective Equipment/Clothing: Wear an approved positive pressure self-contained breathing apparatus and firefighter turnout gear.

Fire Fighting Guidance: Avoid sparks, heat, and open flame. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Hazardous Combustion Products: Carbon oxides (CO, CO₂)

SECTION 6: ACCIDENTAL RELEASE MEASURES

Release Response

Contain spill with dike to prevent entry into sewers or waterways. For large spills, dike and pump into properly labeled

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containers for reclamation or disposal. For small spills, soak up with absorbent material and place in properly labeled containers for disposal. All recovered material should be packaged, labeled, transported and disposed of or reclaimed in conformance with applicable laws and regulations and in conformance with good engineering practices. Reclaim where possible.

SECTION 7: HANDLING AND STORAGE

Handling

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. After handling, always wash hands thoroughly with soap and water. 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.

Storage

Store containers in a cool, dry, ventilated, fire resistant area away from sources of ignition and incompatible materials. Keep container tightly closed and properly labeled.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. Emergency shower and eyewash facility should be in close proximity (ANSI Z358.1)

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.

Skin Wear chemical resistant gloves such as: Butyl rubber. When skin contact is possible, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. The equipment must be cleaned thoroughly after each use.

Eye Wear chemical safety goggles plus full face shield to protect against splashing when appropriate (ANSI Z87.1).

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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. Use care in walking on spilled material.

Occupational Exposure Limits

<u>Component Name</u>	<u>Source / Date</u>	<u>Value</u>	<u>Type</u>
2-Ethoxyethanol	US (ACGIH)	18 mg/m ³	8 HRS/TWA
	US (OSHA)	740 mg/m ³	8 HRS/TWA
1,2-Ethanediol	US (ACGIH)	100 mg/m ³ Aerosol	CEILING
	US (OSHA)	N/L	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquid. Clear

Odor: Mild Sweetish Odor

Odor Threshold: 2.7 ppm (detectable) 6.5 ppm (recognizable)

pH: Not applicable.

Boiling Point/Boiling Range: 135 °C (275 °F)

Freezing Point/Melting Point: -90 °C (-130 °F)

Flash Point: 43 °C (109.4 °F) closed cup

Auto-ignition: 235 °C (455 °F)

Flammability: OSHA/NFPA Class II combustible liquid.

Lower Flammable Limit: 1.8 vol%

Upper Flammable Limit: 14 vol%

Explosive Properties: No Data Available.

Oxidizing Properties: No Data Available.

Vapor Pressure: 3.7 mm Hg @ 20 °C (68 °F)

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Evaporation Rate: 0.41

Relative Density: 0.931 @ 20 °C (68 °F) (Water = 1)

Relative Vapor Density: 3.10 (Air = 1.0)

Viscosity: Not applicable.

Solubility (Water): @ 20 °C (68 °F) 100%

Partition Coefficient (Kow): Not applicable.

Additional Physical and Chemical Properties: No additional information available.

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability

The product is stable.

Conditions to Avoid

All sources of ignition.

Substances to Avoid

Oxidizers, Alkalis, Other

Decomposition Products

Carbon oxides (CO, CO₂)

Hazardous Polymerization

May form peroxides in the presence of air.

Reactions with Air and Water

Does not react with air or water.

SECTION 11: TOXICOLOGICAL INFORMATION

PRODUCT INFORMATION

Product Summary

Repeated, prolonged, excessive exposure may result in kidney damage.

COMPONENT INFORMATION

- *2-Ethoxyethanol 110-80-5*

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Acute Toxicity - Lethal Doses

<u>LC50 (Inhl)</u>	Guinea Pig	2000 PPM	7 HOURS
<u>LD50 (Oral)</u>	Rat	2125 MG/KG	
	Rabbit	3300 MG/KG	
LD50 (Skin)	Rat	3.35 G/KG	

• 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.

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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.

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.

- *Diethylene Glycol Monoethyl Ether 111-90-0*

Acute Toxicity - Lethal Doses

<u>LD50 (Oral)</u>	Rat	5.5 G/KG
	Mouse	6.6 G/KG

<u>LD50 (Skin)</u>	Rabbit	9.0 G/KG
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Acute Toxicity - Effects

Ingestion Rat toxicity data (5.0 g/kg/day) indicates oxalate crystals in urine, degeneration of the liver and renal tubules, and transient dermatitis.

Repeated Dose Toxicity

In a two year drinking water study with rats and mice, no adverse effects were observed at 1% and 5%, respectively.

Carcinogenicity

Not listed by IARC, NTP, or OSHA.

- *Water 7732-18-5*

Repeated Dose Toxicity

No known chronic health effects.

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SECTION 12: ECOLOGICAL INFORMATION

developmental effects are expected in humans.

PRODUCT INFORMATION

Ecotoxicity

This material is highly soluble in water. Limited toxicity tests and models indicate this material should exhibit low toxicity to aquatic organisms. The odor and flavor of this material may attract some wildlife and cause them to consume spilled material.

Environmental Fate and Pathway

This material should biodegrade after an acclimation period, and it is not expected to be environmentally persistent. Due care should be taken to avoid accidental releases to aquatic or terrestrial systems.

Persistence and Degradability

Bioaccumulation: This material is highly soluble in water and should not bioaccumulate in aquatic or terrestrial organisms.

COMPONENT INFORMATION

- *2-Ethoxyethanol 110-80-5*

Ecotoxicity

This material is not classified as harmful or toxic to fish.

Acute toxicity to fish

LC50 / 24 HOUR	goldfish	> 5,000 mg/l
LC50 / 96 HOUR	bluegill.	> 10,000 mg/l

Environmental Fate and Pathway

Expected to have high mobility in soils. Volatilization from dry soil surfaces is expected. Not likely to adsorb to suspended solids and sediment in water. 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.

Persistence and Degradability

Biodegradation: This material is expected to be readily biodegradable.

Bioaccumulation: This material is not expected to bioaccumulate.

- *1,2-Ethandiol 107-21-1*

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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.

Persistence 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 Monoethyl Ether 111-90-0*

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Ecotoxicity

This material is expected to have low toxicity to aquatic species. However, due caution should be exercised to prevent the accidental release of this material to the environment.

Acute toxicity to fish

LC50 / 24 HOUR	goldfish	> 5,000 mg/l
LC50 / 96 HOUR	fathead minnow	26,500 mg/l

Environmental Fate and Pathway

Expected to have high mobility in soils. Volatilization from dry soil surfaces is expected. While this material may evaporate into the air from dry soil, it is unlikely to evaporate from moist soil or water. This material is expected to exist solely as a vapor in the ambient atmosphere. The vapor-phase of this material is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals and ozone.

Persistence and Degradability

Biodegradation: Incubation of diethylene glycol monoethyl ether for 5, 10, and 20 days without an acclimation period

resulted in theoretical BOD values of 5, 31, and 48%, respectively. This material is expected to be readily biodegradable.

Bioaccumulation: BCF = 0.2 This material is not expected to bioaccumulate.

- *Water 7732-18-5*

Ecotoxicity

Not Applicable.

Environmental Fate and Pathway

Not Applicable.

SECTION 13: DISPOSAL CONSIDERATIONS

Recycle if possible. Use only licensed transporters and permitted facilities for waste disposal.

Contaminated

product/soil/water may be U.S. Resource Conservation and Recovery Act (RCRA)/U.S.

Occupational Safety and Health

Administration (OSHA) hazardous waste. Comply with federal, state, or local regulations for disposal.

SECTION 14: TRANSPORT INFORMATION

Special Requirements

If you reformulate or further process this material, you should consider re-evaluation of the regulatory status of the

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components listed in the composition section of this sheet, based on final composition of your product.

Proper Shipping Name Ethylene glycol monoethyl ether

RQ ETHYLENE GLYCOL MONOETHYL ETHER

ID No. UN1171

Hazard Class 3

PG III

SECTION 15: REGULATORY INFORMATION

Regulatory Status

<u>Country</u>	<u>Inventory</u>		
Australia	AICS	X	
Canada	DSL		X
Canada	NDSL		
China	IECS	X	
European Union	EINECS		X
European Union	ELINCS		
European Union	NLP		
Japan	ENCS	X	
Korea	ECL	X	
Philippines	PICCS	X	
United States	TSCA	X	

X = All components are included or are otherwise exempt from inclusion on this inventory.

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

Export notification required.

Ethylene glycol ethyl ether - CASRN 110-80-5

TSCA section 5

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).

<u>Component</u>	<u>RQ</u>
Ethylene Glycol Monoethyl Ether / CAS# 110-80-5	1,000 lbs
Ethylene glycol / CAS# 107-21-1	5,000 lbs

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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.
Fire 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:

<u>Component</u>	<u>Reporting Threshold</u>
Ethylene Glycol Monoethyl Ether / CAS# 110-80-5	1.0%

State Reporting

This product contains the following ingredients for which the state of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute:

- Ethylene glycol monoethyl ether, Reproductive and Developmental Toxin

SECTION 16: OTHER INFORMATION

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall TRInternational, Inc. be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if TRInternational, Inc. has been advised of the possibility of such damages.