MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Effective Date: 12-4-04
Revision:
Last Revision Date:
Emergency Phone: 1-800-424-9300 [CHEMTREC]

Old World Industries, I Ltd.
4065 Commercial Avenue
Northbrook, IL 60062-1851
Phone: (847) 559-2000

PRODUCT: Ethylene Glycol

Chemical Name:	Ethylene Glycol
Chemical Family:	Glycol
Synonyms:	M.E.G, Monoethlyene Glycol; 1, 2-Dihydroxyethane; 1, 2-Ethanediol; Ethylene Dihydrate
Chemical Formula:	$C_2H_6O_2$
Formula Wt.:	62.08

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	CAS No.	Wt %
Ethylene Glycol	107-21-1	99.5%

Exposure Guidelines: OSHA STANDARDS - An employee's exposure to ethylene glycol shall at no time exceed the ceiling value of 50 ppm (125 mg/m3).

AGGIH THRESHOLD LIMIT VALUES - Ceiling Limit 50 ppm, 127 mg/m3 (1981) Vapor & mist

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PRODUCT DESCRIPTION: Ethylene glycol is a clear, colorless liquid with a faint odor.

HEALTH HAZARDS: Overexposure can cause eye and skin irritation, upper respiratory tract irritation, and difficulty breathing. Ingestion of large quantities may be harmful or, in extreme cases, fatal.

FIRST AID: For eye contact, flush with plenty of water. For skin contact, wash with soap and water. If persistent irritation to eyes or skin develops, seek medical attention. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately. If ingested, DO NOT induce vomiting. Seek medical assistance.

FIRE FIGHTING: CAUTION! Spraying with water or foam can cause frothing.

POTENTIAL HEALTH EFFECTS:

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

Signs and Symptoms of Exposure:

Incidental ingestion of small amounts of ethylene glycol is not likely to cause any significant health effects. Ingestion of large quantities may result in irritability, mental sluggishness, dizziness, malaise, abdominal or back pain. Changes in urine output and appearance, fluid retention, jaundice (yellowish skin color), kidney and liver damage, respiratory failure, and unconsciousness are evidence of severe poisoning. Death may occur in extreme cases.

Skin: Contact with liquid may cause slight skin irritation.

Eyes: Contact with liquid may cause slight eye irritation.

Inhalation: Inhalation of mists or high concentrations of vapors (e.g., from hot operations) may cause upper respiratory tract irritation, headaches or nausea.

Ingestion: Ingestion of large quantities may be harmful, and in extreme poisoning, may be fatal; causes central nervous system depression, cardiopulmonary effects, and kidney and liver damage. See "Signs and Symptoms" for more information.

DELAYED/LONG TERM EFFECTS

Carcinogenic Effects: Ethylene glycol is not considered a carcinogen.

Mutagenic: Ethylene glycol is not considered a mutagen.

Teratogenic: Ethylene glycol is considered to be an animal teratogen based on studies in which high levels were given in drinking water. Inhalation and dermal exposure have not produced significant fetotoxicity or malformations in animals. See Section 11, "Toxicology", for further information.

Target Organ Effects: Central nervous system, kidney, liver, fetus.

Medical Conditions Aggravated by Exposure:

Exposure to this chemical may aggravate preexisting skin and respiratory conditions.

4. FIRST AID MEASURES

Ensure physician has access to this MSDS.

Skin:	Wash with soap and water after handling material. If persistent irritation develops, get medical attention.
Eyes:	If eye contact occurs, flush with water. If persistent irritation develops, get medical attention.
Inhalation:	If inhaled, immediately remove victim to fresh air and call **emergency medical care**. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Ingestion:	If quantities of this material are swallowed, immediately **call physician.** DO NOT induce vomiting. Never give anything by mouth or induce vomiting in an unconscious person.
Note to Physicians:	The principal toxic effects of ethylene glycol, when swallowed, are kidney damage and metabolic acidosis. Ethanol is antidotal, and early administration may block the formation of toxic metabolites of ethylene glycol in the liver. Ethanol should be given intravenously, as a 5% solution in sodium bicarbonate, at a rate of about 10ml/hr. A desired therapeutic level of ethanol in blood is 100mg/dl. Hemodialysis may be required. Pulmonary edema with hypoxemia has been described in a number of patients following poisoning with ethylene glycol. The mechanism has not been elucidated but it appears to be noncardiogenic in origin in ventilation and positive end expiratory pressure may be applied. Correction of acidosis is essential.

5. FIRE FIGHTING MEASURES

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Flashpoint (TOC):	116°C (241°F)
Auto Ignition Temp:	398°C (748°F)
LEL:	3.2% by volume
UEL:	15.3% by volume

Sensitive to Mechanical Impact: No Static: No

Extinguishing Media:	Alcohol foam, water, foam, carbon dioxide, or dry chemical
Special Procedures:	Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operate in positive pressure mode.
Explosion Hazards:	For mist in air, moderate explosion hazard when exposed to flames.
Small Fire:	Dry chemical, carbon dioxide or halon.
Large Fire:	Water spray, fog or standard foam is recommended. Cool containers

that are expose to flames with water from the side until well after fire is out. If the fire involves a tank car or truck, isolate the area for ½ mile in all directions. Stay away from ends of tanks.

6. ACCIDENTAL RELEASE MEASURES

Large Spill:	Wear self-contained breathing apparatus and full protective clothing. Stop leak if you can do so without risk. Ventilate area. Dike area if feasible. Take up with vermiculite, dry sand, or earth.
Small Spill:	Use full protective clothing including high efficiency particulate respirator. Take up with vermiculite, dry sand, or earth.

7. HANDLING AND STORAGE

Keep containers tightly closed. Store in a cool, dry, well-ventilated location, away from strong oxidizers, potential fire hazards, and incompatible chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection:	Respiratory protection is required if airborne concentration exceeds TLV. At any detectable concentration, any self-contained breathing apparatus with a full face piece and operated in a pressure-demand or other positive pressure mode or any supplied-air respirator with a full face piece and operated in a pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Escape:	Any air-purifying full face piece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister or any appropriate escape-type self-contained breathing apparatus.
Skin Protection:	Protective gloves recommended when prolonged skin contact cannot be avoided. Polyethylene; Neoprene, Nitrile, Polyvinyl alcohol; Natural Rubber; Butyl Rubber. Safety shower should be available.
Eye Protection:	Safety goggles and face shield. Emergency eyewash should be available. Contact lenses should not be worn when working with this chemical.
Engineering Controls:	Use general or local exhaust ventilation to meet TLV requirements.
Special Precautions:	Trace quantities of ethylene oxide (EO) may be present in this product. While these trace quantities could accumulate in the headspace areas of storage transport vessels, they are not expected to create a condition which will result in EO concentration greater than 0.5 ppm (8 hour TWA) in the breathing zone of the workplace for appropriate applications. OSHA has established a permissible exposure limit of 1.0 ppm 8 hour TWA for EO.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Colorless viscous liquid		
Odor:	Mild odor	Physical State:	Liquid
Boiling Point:	197°C (386°F) @ 760 mm Hg	Freezing Point:	-13°C (8.6°F)
Vapor Pressure:	0.06 mm @ 20°C (68°F)	Vapor Density (air = 1):	2.1
Solubility:	Complete	Volatiles:	0% @ 20°C(68°F)
Specific Gravity (H_2O=1):	1.12 @ 15.5°C (60.4°F)	Evaporation Rate(BuAc=1):	0.01
Odor Threshold:	Odor index: 3 @ 20°C (68°F)	Oil/Water Coefficient:	Not available

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions of use.

Incompatibility: Strong oxidizing agents, strong acids and polymerization catalysts. Contact of aqueous ethylene glycol solution with DC-energized silvered copper wires causes ignition of the latter. A mixture of phosphorus (V) sulfide, ethylene glycol, and hexane in a mantle-heated flask spontaneously overheated and exploded at an internal temperature of about 180°C. Mixing of equal weights of ethylene glycol and potassium dichromate at 100°C caused heat to evolve.

Hazardous Decomposition Products: Acrid smoke and irritating fumes. Carbon monoxide and carbon dioxide may evolve.

Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

Irritation data:

skin-rabbit	500 mg open MILD
eye-rabbit	12 mg/m3/3D
eye-rabbit	500 mg/24H MILD
eye-rabbit	100 mg/1H MILD

Mutagenic Data: DNA Inhibition System (human: lymphocyte) 320 mmol/l
Mutation in Mammalian Somatic Cells (mouse: lymphocyte) 100 mml/l

Toxicity Data:

oral-rat	LD50:	4700 mg/kg
intraperitoneal-rat	LD50:	5010 mg/kg
subcutaneous-rat	LD50:	2800 mg/kg
intravenous-rat	LD50:	3260 mg/kg
intramuscular-rat	LD50:	3300 mg/kg
intraperitoneal-mouse	LD50:	5614 mg/kg
oral-mouse	LDLo:	7500 mg/kg

Classification of carcinogenicity: None

12. ECOLOGICAL CONSIDERATIONS

ECOTOXICITY VALUES:

LD50 Carassius auratus (goldfish) > 5,000 mg/1/24 hr
LC50 Guppies (Poecilia reticulata) 49, 300 ppm/7 days
LC50 Rainbow trout 18500 mg/1/96 hr
LC50 Rainbow trout 41000 mg/1/96 hr
LC50 Brown shrimp (Crangon crangon) given > 100 mg/1/48 hr aerated salt water
LC50 Goldfish given 5000 mg/1/24 hr

Toxicity threshold (cell multiplication inhibition test):
Bacteria (Pseudomonas putida): 10,000 mg/l
Protozoa (Entosiphon sulcatum) and (Uronema parduczi Chatton-Lwoff): > 10,000 mg/l
Algae (Chlorella pyrenoidosa): 180,000 mg/l
Algae (Microcystis aeruginosa): 2,000 mg/l
Green algae (Scenedesmus quandiricuada): > 10,000 mg/l

TERRESTRIAL FATE: When released on land, ethylene glycol, because it is completely soluble in water, may leach into the ground. Its fate in soil is unknown, although it is easily biodegraded in water, which suggests that it will biodegrade rapidly in soil.

AQUATIC FATE: When released into water, ethylene glycol will readily biodegrade (half-life several days). Ethylene glycol would not be expected to absorb to sediment or volatilze.

ATMOSPHERIC: Ethylene glycol in the vapor phase will react with hydroxyl radicals in the atmosphere. Based on ahydroxyl radical concentration of 5X10+5 radicals/cm3, ethylene glycol is predicted to have a half-life of about 2 days in the atmosphere.

BIODEGRADATION: BOD - 0.47 g OXYGEN/g ETHYLENE GLYCOL
COD - 1.29 g OXYGEN/g ETHYLENE GLYCOL

There is a large body of information confirming the biodegradability of ethylene glycol aerobic systems using activated sludge, sewage, and soil inocula. Degradation was essentially complete in <1-4 days although 100% theoretical biological oxygen demand may not be realized for several weeks (1-10). In a river die-away test, degradation was completed in 3 days at 20°C and 5-14 days at 8°C (11). Data are scant for anaerobic systems, but the evidence indicates that it readily biodegrades in these systems also (12). [(1) Bridie AL et al; Water Res 13: 627-30 (1979) (2) Conway RA et al; Environ Sci Technol 17: 107-12 (1983) (3) Haines JR, Alexander M: Appl Microbiol 29: 621-5 (1975) (4) Helfgott TB et al; An index of refractory organics USEPA 600/2-77-174 (1977) (5) Matsui S et al; Prog Water Technol 7: 645-59 (1975) (6) Means JL, Anderson SJ; Water Air Soil Poll 16: 301-15 (1981) (7) Pitter P; Water Res 10: 231-5 (1976) (8) Price KS et al; J Water Pollut Control Fed 46: 63-77 (1974) (9) Schefer W, Waelchli O; Z Wasser Abwasser Forsch 13: 205-9 (1980) (10) Zahn R, Wellens H; Z Wasser Abwasser Forsch 13: 1-7 (1980) (11) Evans WH, David EJ; Water Res 8: 97-100 (1974) (12) Dwyer DF, Tiedje JM; Appl Environ Microbiol 46:

185-90 (1983)]

ABIOTIC DEGRADATION: Photo-oxidation in aqueous systems will not be significant (1,2). Glycols are known to be resistant to hydrolysis (3). Ethylene Glycol reacts with photochemically produced hydroxyl radicals with a rate constant of 7.7X10-2 m3/molecules/s (4). Assuming a hydroxyl radical concentration of 5X10+5/cu cm, the atmospheric half-life would be 50 hr. [(1) Dorfman LM, Adams GE; Reactivity of the hydroxyl radical in aqueous solutions 51 p NSRD-NBS-46 (1973) Hendry DG, Kenley RA; Atomospheric reaction products of organic compounds. 80 p USEPA 560/12-79-001 (1979) (3) Lyman WJ et al; Handbook of Property Estimation Methods. Environmental Behavior of Organic Compounds p. 7-1 to 7-48 NY: McGraw Hill (1982) (4) Atkinson R; Chem Rev 85: 69-201(1985)]

BIOCONCENTRATION: The bioconcentration factor for ethylene glycol in fish (Golden ide) was reported to be 10 after 3 days of exposure(1). In algae (Chlorella fusca), the bioconcentration factor was 190 after 1 day (1). Its extremely low octanol/water partition coefficient (log = -1.36 (2)) suggests that it will not bioconcentrate in fish. [(1) Freitag D et al; Chemosphere 14: 1589-616 (1985) (2) Hansch C, Leo AJ; Medchem Project Issue No 26. Claremont CA: Pomona College (1985)]

SOIL ADSORPTION/ MOBILITY: No information concerning the adsorption of ethylene glycol could be found in the literature. Its low octanol/water partition coefficient (log P = -1.36 (1)) indicates that its adsorption to soil will be low (SRC). [(1) Hansch C, Leo AJ; Medchem Project Issue No. 19 Claremont, CA Pamona College (1981)

VOLATILIZATION: The Henry's Law constant can be estimated to be 2.34X10-10 atm-m3/mole at 25°C (1). From this value of the Henry's Law constant, ethylene glycol will not evaporate from water. Due to its relatively low vapor pressure, it will not evaporate very rapidly from soil (SRC). [(1) Hine J Mookerjee PK; J Org Chem 40: 292-8 (1975) (2) Lyman WJ et al; Handbook of Chemical Estimation Methods NY: McGraw-Hill pp. 15-15 to 15-29 (1982)]

13. DISPOSAL CONSIDERATIONS

DO NOT discharge to sewer. Wear appropriate personal protection. Take up with sand, vermiculite, or similar inert material. Dispose in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION (for Bulk Shipment ONLY)

Proper Shipping Name:	Environmentally Hazardous Substance Liquid NOS (Ethylene Glycol)		
Hazard Class:	9	ID No.:	UN3082
Label:	Miscellaneous RQ Product	Packaging Group:	III

Shipments with individual packages, i.e. drums, pails or gallons, containing less than RQ (5,000 pounds) not subjected to regulation.

15. REGULATORY INFORMATION

United States -

TSCA - Inventory:	Listed
Water Standards:	No data available
Atmospheric Standards:	Clean Air Act (1990) - List of Hazardous Air Contaminants: Listed
CERCLA:	Hazardous Substances (Reportable Quantities): RQ = 5,000 pounds
SARA Title III:	Section 311/312 - Categories: Acute; chronic
	Section/312 - Inventory Reporting: Ethylene Glycol is subject to Tier I and/or Tier II annual inventory reporting.
	Section 313 - Emission Reporting: Ethylene Glycol is not subject to Form R reporting requirements.
	Section 302 - Extremely Hazardous Substances: Ethylene Glycol is not listed.

Other Regulations -

California - Exposure Limits - Ceilings:	vapor - 50 ppm ceiling; 125 mg/m3 ceiling
Director's List of Hazardous Substances:	listed
Florida Hazardous Substances List:	listed
Massachusetts Right-to-Know List:	listed
Minnesota Haz. Subs. List:	listed (particulate and vapor)
New Jersey Right-to-Know List (Total):	sn 0878
Pennsylvania Right-to-know List:	environmental hazard
Michigan Critical Materials List:	not listed
Canada WHMIS:	1% on Ingredient Disclosure List - item 716 (860)
Risk Phrases:	R: 22 S: 2

16. OTHER INFORMATION

Contact: Karen Engelbrecht, Technical Manager Phone: (847) 559-2000

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