

# Material Safety Data for: Ethylene Glycol

## 1. PRODUCT IDENTIFICATION

<b>Name</b>	Ethylene Glycol
<b>Synonyms</b>	1,2-ethanediol, 1,2-dihydroxyethane, ethylene dihydrate,
<b>CAS#</b>	107-21-1
<b>Product Uses</b>	antifreeze in heat transfer fluids, humectant, plasticizer, hydraulic fluid, solvent

## 2. INGREDIENTS

	%	TWAEV / TLV mg/m <sup>3</sup>	LD <sub>50</sub> ORAL	(mg/kg) SKIN	LC <sub>50</sub> ppm INHALATION
1,2-ethanediol	100%	40 / 100	1650	9500	10,900

## 3. (a) HAZARDS SUMMARY

**Hazards, Quick Guide:** delayed toxicity on ingestion; rodent teratogen

### Canada – WHMIS

Key:

### D 2A

*B 2 – Flash Point <38°C, B 3 – Flash Point >38°C & <93°C*

*D 1 – Immediately Toxic, D 2 – Chronic Toxicity*

*C – Oxidising Substance, E – Corrosive*

### U.S.A. – HMIS

Key:

### Health – 2, Fire – 1, Reactivity – 0

*0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe*

## 3. (b) HAZARDS – TOXICITY

### Effects, Acute Exposure

Skin Contact	no effect
Skin Absorption	slight; no toxic effects likely by this route
Eye Contact	no effect
Inhalation	vapour becomes irritating above 127mg/m <sup>3</sup> ; intolerable above 240mg/m <sup>3</sup> – <i>inhalation is unlikely under industrial conditions due to low vapour pressure &amp; elevated viscosity</i>
Ingestion	the product is an alcohol (dihydric) producing similar intoxication/depression symptoms; high doses may cause convulsions & coma; survival may be followed by renal failure after 3 days & possible death

**NOTE:** Mammals metabolise EG into oxalic acid. The renal crystallisation of oxalic acid is responsible for renal failure & lethality.

### Effects, Chronic Exposure

General	prolonged absorption may cause vision to deteriorate & damage kidneys
Sensitising	not a sensitiser in humans or animals – <i>very few human cases reported</i>
Carcinogen/Tumorigen	not considered a carcinogen in humans or animals; tumorigen in rodents receiving high but sub-lethal oral doses – <i>not an expected route of industrial exposure</i>
Reproductive Effect	teratogen in rodents given high but sub-lethal oral doses; <i>developmental abnormalities reported in the children of mothers exposed to both EG and ethylene glycol monomethyl ether</i>
Mutagen	no known effect on humans or animals
Synergistic With	not known
LD <sub>50</sub> (oral)	1650 & 2000mg/kg (cat); 4700-5000mg/kg (rat), 5500mg/kg (mouse & dog), 6610mg/kg (guinea pig)
LD <sub>50</sub> (skin)	10,620mg/kg (rabbit)
LC <sub>50</sub> (inhalation)	2725mg/m <sup>3</sup> (rat)

**NOTE:** LD<sub>50</sub> & LC<sub>50</sub> test data vary widely between species. Relevance to human toxicity should not be assumed.

**Please ensure that this MSDS is given to, and explained to people using this product.**

**(Ethylene Glycol, cont'd)**

**page 2**

**4. FIRST AID**

- SKIN: Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.
- EYES: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is irritation.
- INHALATION: Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.
- INGESTION: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.

*Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.*

**NOTE TO DOCTOR:** Following gastric lavage, oral ethanol and calcium gluconate help to reduce toxicity. If kidney function is normal, administer 4 litres of water daily to speed glycol excretion. If renal function is poor, dialysis should be used to speed glycol elimination.

**5. PHYSICAL PROPERTIES**

Odour & Appearance	clear, viscous, colourless, hygroscopic, odourless liquid
Odour Threshold	none – odourless ( <i>any odour indicates an impure product</i> )
Vapour Pressure	0.05mmHg / 0.007kPa (20°C / 68°F)
Evaporation Rate ( <i>Butyl Acetate = 1</i> )	below 0.01 – not considered volatile
Vapour Density (air = 1)	2.1
Boiling Range	198°C / 388°F
Freezing Point	-13°C / 9°F
Specific Gravity	1.114 (20/20°C)
Water Solubility	complete
Also soluble in	lower alcohols, ethers, esters, ketones; poorly soluble in hydrocarbons & chlorinated HCs
Viscosity	21centipoise (20°C / 68°F)
pH	none – ( <i>does not liberate hydrogen ions when dissolved</i> )
Conversion Factor	1ppm = 2.53g/m <sup>3</sup>
Molecular Weight	62grams per mole

**6. FLAMMABILITY & FIRE FIGHTING**

Flash Point	111°C / 232°F (closed cup)
Autoignition Temperature	398°C / 748°F
Flammable Limits	3.2% – 22%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Fire Fighting Precautions	water fog or water spray; fire fighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge on agitation or pumping

**7. STABILITY / REACTIVITY**

Dangerously Reactive With	strong oxidising agents; perchloric acid
Also Reactive With	strong acids or strong alkalis may cause decomposition with release of hydrogen; strong acids cause gas evolution and increased temperature; corrosive to aluminium above 100°C
Stability	stable; will not polymerize
Decomposes in Presence of	not known
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

***Please ensure that this MSDS is given to, and explained to people using this product.***

(Ethylene Glycol, cont'd)

**8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL**

ACGIH TLV	40ppm / 100mg/m <sup>3</sup>
OSHA PEL	not listed
STEL	not listed
Ventilation	no special ventilation required; if mist or vapour is created, point source ventilation should be installed
Hands	no special protective gloves required
Eyes	safety glasses with side shields – <i>always protect the eyes</i>
Clothing	no special protective clothing required

**9. HANDLING & STORAGE**

Store in a cool, dry environment, away from sources of ignition, heat and oxidising agents. This product absorbs moisture from the air. Ensure that containers are tightly sealed. Bulk storage tanks should have moisture traps on their vents.

Avoid breathing product vapour/mist. Use with adequate ventilation.

Never cut, drill, weld or grind on or near this container. Avoid contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

**WARNING: This product has a quite sweet taste, making it attractive for animals and children to drink. Ensure that spills are dealt with promptly to avoid inadvertent poisoning.**

**10. SPILL PROCEDURES**

Leak Precaution	dyke to control spillage and prevent environmental contamination
Handling Spill	ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep & pick up using plastic or aluminium shovel, & store in closed containers for recycling or disposal

**WARNING: Depending on the surface, spilled product may be very slippery!**

**11. DISPOSAL**

Waste Disposal	<b>do not flush to sewer</b> , recycle if possible, may be incinerated in approved facility after mixing with a suitable flammable waste
Containers	<b>Drums</b> should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use. <b>Pails</b> must be vented and thoroughly dried prior to crushing and recycling. <b>IBCs</b> (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years. <i>Never cut, drill, weld or grind on or near this container, even if empty</i>

**12. ENVIRONMENTAL INFORMATION**

Bioaccumulation	this product is highly water soluble and cannot bioaccumulate; biological half-life 3-5 hours
Biodegradation	this product degrades readily and rapidly in the presence of oxygen; biodegradation essentially complete in 1-4 days
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 50hours
Mobility in soil, water	this product is water soluble and moves readily in soil and water
<b>Aquatic Toxicity</b>	
LC <sub>50</sub> (Fish, 96hr)	>10,000mg/litre (lepomis macrochirus), 41,000mg/litre (oncorhynchus mykiss), >10,000mg/litre (pimephales promelas)
EC <sub>50</sub> (Crustacea, 48hr)	>100mg.litre (crangon crangon)

**NOTE: Non-mammalian species metabolise ethylene glycol differently from mammals. Its toxicity to non-mammalians is very low.**

**Please ensure that this MSDS is given to, and explained to people using this product.**

(Ethylene Glycol, cont'd)

**13. TRANSPORT REGULATIONS**

<b>Canada TDG</b>	<b>PIN</b>	<b>UN-not regulated for transport</b>
<b>AND</b>	<b>Shipping Name</b>	<b>not regulated for transport</b>
<b>U.S.A. 49 CFR</b>	<b>Class</b>	<b>not regulated for transport</b>
	<b>Packing Group</b>	<b>not regulated for transport</b>
<b>Marine Pollutant</b>		<b>not a marine pollutant</b>

**14. EMERGENCY INFORMATION**

<b>Canada</b>	<b>Call CANUTEC (collect)</b>	<b>(613) 996-6666</b>
<b>U.S.A.</b>	<b>Call CHEMTREC</b>	<b>(800) 424-9300</b>

**15. REGULATIONS**

<b>Canada DSL</b>	<b>on inventory</b>
<b>U.S.A. TSCA</b>	<b>on inventory</b>
<b>Europe EINECS</b>	<b>on inventory (EC# 203-473-3)</b>

**Allowable Tolerances:** Ethylene glycol is exempted from the requirement of a tolerance when used as an antifreeze or deactivator for all pesticides used before crop emerges from soil and in herbicides before or after crop emerges in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Ethylene glycol as a component of pesticide formulations is exempt from the requirement of a tolerance when used in foliar applications to peanut plants.

**OSHA Standards:** Vacated 1989 OSHA PEL Ceiling value 50 ppm (125 mg/cu m) is still enforced in some states.

**NIOSH Recommendations:** NIOSH questioned whether the OSHA PEL proposed for ethylene glycol [ceiling 50 ppm] is adequate to protect workers from recognized health hazards.

**Threshold Limit Values:** Ceiling Limit: 100 mg/cu m. /Aerosol only/, A4; Not classifiable as a human carcinogen.

**Atmospheric Standards:** This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. Ethylene glycol is produced, as an intermediate or a final product, by process units covered under this subpart. Listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants. Ethylene glycol is included on this list.

**Federal Drinking Water Guidelines:** EPA 7000 ug/l

**State Drinking Water Guidelines:** Arizona 5500 ug/l, Florida 14,000 ug/l, Massachusetts 14,000 ug/l, Minnesota 10000 ug/l, New Hampshire 7000 ug/l, New Jersey 290 ug/l, California 14,000 ug/l

**CERCLA Reportable Quantities:** Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 5000 lb or 2270 kg. The toll free number of the NRC is (800) 424-8802; In the Washington D.C. metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

**FIFRA Requirements:** Ethylene glycol as a component of pesticide formulations is exempt from the requirement of a tolerance when used in foliar applications to peanut plants. Ethylene glycol is exempted from the requirement of a tolerance when used as an antifreeze or deactivator for all pesticides used before crop emerges from soil and in herbicides before or after crop emerges in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. As the federal pesticide law FIFRA directs, EPA is conducting a comprehensive review of older pesticides to consider their health and environmental effects and make decisions about their future use. Under this pesticide reregistration program, EPA examines health and safety data for pesticide active ingredients initially registered before November 1, 1984, and determines whether they are eligible for reregistration. In addition, all pesticides must meet the new safety standard of the Food Quality Protection Act of 1996. Pesticides for which EPA had not issued Registration Standards prior to the effective date of FIFRA, as amended in 1988, were divided into three lists based upon their potential for human exposure and other factors, with List B containing pesticides of greater concern and List D pesticides of less concern. Ethylene glycol is found on List D. Case No: 4033; Pesticide type: insecticide, fungicide, antimicrobial; Case Status: No products containing the pesticide are actively registered ... The case /is characterized/ as "cancelled." Under FIFRA, pesticide producers may voluntarily cancel their registered products. EPA also may cancel pesticide registrations if registrants fail to pay required fees or make/meet certain reregistration commitments, or if EPA reaches findings of unreasonable adverse effects.; Active ingredient (AI): Ethylene glycol; AI Status: The active ingredient is no longer contained in any registered pesticide products ... "cancelled."

**FDA Requirements:** Ethylene glycol is an indirect food additive for use only as a component of adhesives.

**16. PREPARATION INFORMATION**

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577

File Name: Ethyl-gly

With data from RTECS, Haz. Substance Data Base, Cheminfo (CCOHS), IUCLID Datasheets (European Chem. Substance Info. System), & others, as available

Preparation Date: November 2003 Revision Date: August 2006, August 2009

**Please ensure that this MSDS is given to, and explained to people using this product.**