**Product Name: Ethylene Glycol**

**Safety Data Sheet**

1. **PRODUCT IDENTIFICATION**

**Name**
Ethylene Glycol

**Synonyms**
1,2-ethanediol, 1,2-dihydroxyethane, ethylene dihydrate,

**CAS#**
107-21-1

**Europe EC#**
203-473-3

**Product Uses**
antifreeze in heat transfer fluids, humectant, plasticiser, hydraulic fluid, solvent

2. **HAZARDS**

**Quick Guide:** delayed toxicity – potentially deadly – on ingestion; rodent teratogen

**Canada – WHMIS**

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 2A</td>
<td>Flash Point $&lt;38^\circ C$, B 3 – Flash Point $&gt;38^\circ C$ &amp; $&lt;93^\circ C$</td>
</tr>
<tr>
<td>D 1</td>
<td>Immediately Toxic, D 2 – Chronic Toxicity</td>
</tr>
<tr>
<td>C</td>
<td>Oxidising Substance, E – Corrosive, F – Reactive Substance</td>
</tr>
</tbody>
</table>

**U.S.A. – HMIS**

<table>
<thead>
<tr>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2, 1, 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. **COMPOSITION**

<table>
<thead>
<tr>
<th>1,2-ethanediol</th>
<th>%</th>
<th>TWAEV / TLV</th>
<th>LD₅₀ (mg/kg)</th>
<th>LD₅₀ (mg/kg)</th>
<th>LC₅₀ ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>40 / 100</td>
<td>ORAL</td>
<td>1650</td>
<td>9500</td>
<td>10,900</td>
</tr>
</tbody>
</table>

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.

5. **FIRE FIGHTING & FLAMMABILITY**

**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

**Firefighting Precautions**
water fog or water spray; firefighters must wear SCBA

**Static Charge Accumulation**
cannot accumulate a static charge on agitation or pumping

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

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; shovel & store in closed containers for recycling or disposal

7. 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 sweet taste. It is “attractive” for pets and children to drink. Ensure that spills are dealt with promptly to avoid inadvertent poisoning.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario CEV 40ppm / 100mg/m³
ACGIH TLV-C 40ppm / 100mg/m³
OSHA PEL-C 20ppm / 50mg/m³
STEL (lowest listed) not listed

Ventilation: mechanical ventilation may be required to control airborne titre; depending on handling procedures

Hands: nitrile or “Viton” gloves recommended – other types may also protect; consult supplier to confirm suitability

Eyes: safety glasses with side shields – always protect the eyes

Clothing: wear impermeable (above) apron, boots, & long sleeves if there is any danger of splashing,

9. PHYSICAL PROPERTIES

Odour & Appearance: clear, colourless, odourless, viscous, hygroscopic liquid
Odour Threshold: not known – odourless
Vapour Pressure: 0.05mmHg / 0.007kPa (20°C / 68°F)
Evaporation Rate (Butyl Acetate = 1): not known – not considered volatile
Vapour Density (air = 1): 2
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: most organic solvents, poor solubility in hydrocarbons, chloroform
Viscosity: 21centipoise (25°C / 77°F)
pH: none – (does not liberate hydrogen ions when dissolved)
Conversion Factor: 1ppm = 2.53mg/m³
Molecular Weight: 62grams/mole

10. REACTIVITY

Dangerously Reactive With: strong oxidising agents, perchloric acid, strong alkalis
Also Reactive With: strong acids
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.
11. **TOXICITY**

**Effects, Acute Exposure**

<table>
<thead>
<tr>
<th>Route</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Contact</td>
<td>no effect</td>
</tr>
<tr>
<td>Skin Absorption</td>
<td>slight; no toxic effects likely by this route</td>
</tr>
<tr>
<td>Eye Contact</td>
<td>no effect</td>
</tr>
<tr>
<td>Inhalation</td>
<td>mist becomes irritating above 127 mg/m$^3$; intolerable above 240 mg/m$^3$. Inhalation is unlikely under industrial conditions due to low vapour pressure &amp; elevated viscosity</td>
</tr>
<tr>
<td>Ingestion</td>
<td>ethylene glycol is an alcohol producing similar intoxication/depression symptoms; high doses may cause convulsions &amp; coma; survival may be followed by renal failure after 3 days &amp; possible death</td>
</tr>
</tbody>
</table>

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

**Effects, Chronic Exposure**

<table>
<thead>
<tr>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
</tr>
<tr>
<td>Sensitising</td>
</tr>
<tr>
<td>Carcinogen/Tumorigen</td>
</tr>
<tr>
<td>Reproductive Effect teratogen in rodents given high but sub-lethal oral doses; developmental abnormalities reported in children of mothers exposed to EG &amp; ethylene glycol monomethyl ether (a higher level of exposure than likely in Canada)</td>
</tr>
<tr>
<td>Mutagen</td>
</tr>
<tr>
<td>Synergistic With</td>
</tr>
</tbody>
</table>

**LD$_{50}$ (oral)**

- 1650 & 2000 mg/kg (cat)
- 2725, 4700-5000 mg/kg (rat), 5500 mg/kg (mouse & dog), 6610 mg/kg (guinea pig)

**LD$_{50}$ (skin)**

- 9530 mg/kg (rabbit)

**LC$_{50}$ (inhalation)**

- 2725 mg/m$^3$ (rat)

*NOTE: LD$_{50}$ & LC$_{50}$ test data vary widely between species. Relevance to human toxicity should not be assumed.*

12. **ECOLOGICAL INFORMATION**

**Bioaccumulation**

- cannot bioaccumulate; biological $\frac{1}{2}$-life 3-5 hours

**Biodegradation**

- degrades readily and rapidly in the presence of oxygen; biodegradation essentially complete in 1-4 days

**Abiotic Degradation**

- reacts with atmospheric hydroxyl radicals; its estimated $\frac{1}{2}$-life in air is 50 hours

**Mobility in soil, water**

- water soluble; moves readily in soil & water

**Aquatic Toxicity**

- LC$_{50}$ (Fish, 96hr) >10,000 mg/litre (Lepomis macrochirus), 40,760 mg/litre (Oncorhynchus mykiss), 49,000-57,000 mg/litre (Pimephales promelas), 16,000 mg/litre (Poecilia reticulata)
- EC$_{50}$ (Crustacea, 48hr) >20,000 mg/litre (Artemia salina), 41,000-57,600 mg/litre (Daphnia magna)
- EC$_{50}$ (Algae) 6500-7500 & 24,000 mg/litre (Selenastrum capricornutum),
- EC$_{50}$ (Bacteria) 10,000 mg/litre ("domestic sewage sludge"), 35,000 mg/litre (Paramecium caudatum), 621 mg/litre (Photobacterium phosphoreum), 10,000 mg/litre (Pseudomonas putida)

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

13. **DISPOSAL**

**Waste Disposal**

- do not flush to sewer, recycle solvent if possible, may be incinerated in approved facility after mixing with a suitable flammable waste

**Containers**

- Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.
- Pails must be vented and thoroughly dried prior to crushing and recycling.
- IBCs (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.

*Never cut, drill, weld or grind on or near this container, even if empty*

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

| Canada TDG | PIN | UN – not regulated for transport |
| AND | Shipping Name | not regulated for transport |
| U.S.A. 49 CFR | Class & Packing Group | not a marine pollutant |

EMERGENCY INFORMATION

| Canada | Call CANUTEC (collect) | (613) 996-6666 |
| U.S.A. | Call CHEMTREC | (800) 424-9300 |

15. REGULATIONS

| Canada DSL | on inventory |
| U.S.A. TSCA | on inventory |
| Europe EINECS | on inventory |

Europe Classification

Europe Risk Phrases: R: 22 – Harmful if swallowed.
Europe Safety Phrases: S: 2 – Keep out of reach of children.

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 14,000 ug/L

State Drinking Water Guidelines: Arizona 5500 ug/l, California 14,000 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

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 met 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/maintain 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. OTHER INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577
Data from RTECS, HSDB (Haz. Substance Data Base), Cheminfo (CCOHS), IUCLID Datasheets (ESIS – European Chem. Substance Info. System), & others.
Preparation Date: November 2003 Revision Date: August 2006, August 2009, June 2012

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