Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name: Radiator Antifreeze
Synonyms: Ethylene Glycol blend with proprietary anticorrosion salts
CAS#: 107-21-1*
Product Uses: motor vehicle antifreeze

2. HAZARDS

Quick Guide: delayed toxicity (kidney damage) – potentially deadly – 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, F – Reactive Substance

U.S.A. – HMIS
Key:
Health – 2, Fire – 1, Reactivity – 0
0= minimal, 1= slight, 2= moderate, 3= serious, 4= severe

3. COMPOSITION

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>TWAEV / TLV</th>
<th>LD50 (mg/kg)</th>
<th>LC50 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene Glycol</td>
<td>95-97%*</td>
<td>40 / 100</td>
<td>1650</td>
<td>9500</td>
</tr>
<tr>
<td>Water (CAS# 7732-18-5)</td>
<td>1-3%*</td>
<td>none</td>
<td>90,000</td>
<td>not toxic</td>
</tr>
</tbody>
</table>

*Concentration varies depending on the quantity and type of additives present. These additits do not change the hazard classification of ethylene glycol

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. 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
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

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,
- shovel & store in closed containers for recycling or disposal

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

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: no special protective clothing required

9. **PHYSICAL PROPERTIES**

- Odour & Appearance: clear, viscous, fluorescent green*, hygroscopic, odourless liquid
- Odour Threshold: none – odourless (*any odour indicates an impure product*)
- Vapour Pressure: 0.05mmHg / 0.007kPa (20°C / 68°F)
- Evaporation Rate (Butyl Acetate = 1): below 0.01 – not considered volatile
- Vapour Density (air = 1): 2.1
- Boiling Range: 158°C / 317°F**
- Freezing Point: -20°C / -4°F**
- Specific Gravity: 1.115** (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 – (*does not liberate hydrogen ions when dissolved*)
- Conversion Factor: 1ppm = 2.53g/m³
- Molecular Weight: 62grams per mole – ethylene glycol only

*Colour is added to this product; other colours are possible.

**NOTE: Depending on the additive package, more or less water may be added to the product. This may alter some of the physical properties.*
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

11. **TOXICITY**

*Effects, Acute Exposure*

Skin Contact: no effect

Skin Absorption: slight; no toxic effects likely by this route

Eye Contact: no effect

Inhalation: mist becomes irritating above 127mg/m³; intolerable above 240mg/m³ – *inhalation is unlikely under industrial conditions due to low vapour pressure & elevated viscosity*

Ingestion: ethylene glycol is an alcohol 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 & EC's lethality.

*Effects, Chronic Exposure*

General: prolonged absorption may cause vision to deteriorate & damage kidneys

Sensitising: not a sensitiser in humans or animals – *very few human cases reported*

Carcinogen/Tumorigen: not considered a carcinogen in humans or animals; tumorigen in rodents receiving high but sub-lethal oral doses – *not an expected route of industrial exposure*

Reproductive Effect: teratogen in rodents given high but sub-lethal oral doses; *developmental abnormalities reported in children of mothers exposed to EG & ethylene glycol monomethyl ether (a higher level of exposure than likely in Canada)*

Mutagen: no known effect on humans or animals

Synergistic With: not known

LD₅₀ (oral): 1650 & 2000mg/kg (cat); 2725, 4700-5000mg/kg (rat), 5500mg/kg (mouse & dog), 6610mg/kg (guinea pig)

LD₅₀ (skin): 9530mg/kg (rabbit)

LC₅₀ (inhalation): 2725mg/m³ (rat)

**NOTE:** LD₅₀ & LC₅₀ test data vary widely between species. Relevance to human toxicity should not be assumed.

12. **ECOLOGICAL INFORMATION**

Bioaccumulation: cannot bioaccumulate; biological ½-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 ½-life in air is 50hours

Mobility in soil, water: water soluble; moves readily in soil & water

**Aquatic Toxicity**

LC₅₀ (Fish, 96hr): >10,000mg/litre (Lepomis macrochirus), 40,760mg/litre (Oncorhyncus mykiss), 49,000-57,000mg/litre (Pimephales promelas), 16,000mg/litre (Poecilia reticulata)

EC₅₀ (Crustacea, 48hr): >20,000mg/litre (Artemia salina), 41,000-57,600mg/litre (Daphnia magna)

EC₅₀ (Algae): 6500-7500 & 24,000mg/litre (Selenastrum capricornutum), 10,000mg/litre (“domestic sewage sludge”), 35,000mg/litre (Paramecium caudatum), 621mg/litre (Photobacterium phosphoreum), 10,000mg/litre (Pseudomonas putida)

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

**NOTE:** The inorganic salts which act as corrosion inhibitors in this product do not biodegrade and are not toxic to aquatic life.

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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_.

14. **TRANSPORT CLASSIFICATION**

<table>
<thead>
<tr>
<th>Canada TDG PIN</th>
<th>UN – not regulated for transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>AND Shipping Name</td>
<td>not regulated for transport</td>
</tr>
<tr>
<td>U.S.A. 49 CFR Class &amp; Packing Group</td>
<td>not a marine pollutant</td>
</tr>
<tr>
<td>Marine Pollutant</td>
<td>ERAP Required NO</td>
</tr>
</tbody>
</table>

**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**

R: 22 – Harmful if swallowed.

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) 424-8882; 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).

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, August 2012

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