Established in 1981 megaloid laboratories limited
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Safety Data Sheet

1. PRODUCT INDENTIFICATION

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	**D 2A**
Key:	***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	**Health – 2, Fire – 1, Reactivity – 0**
Key:	***0****=minimal,* ***1****=slight,* ***2****=moderate,* ***3****=serious,* ***4****=severe*

3. COMPOSITION

	%	TWAEV / TLV mg/m^3	LD_{50} (mg/kg) ORAL	LD_{50} (mg/kg) SKIN	LC_{50} ppm INHALATION
1,2-ethanediol	100%	40 / 100	1650	9500	10,900

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/m^3
ACGIH TLV-C	40ppm / 100mg/m^3
OSHA PEL-C	20ppm / 50mg/m^3
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/m^3
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

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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/m^3; intolerable above 240mg/m^3 – *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
LD_{50} (oral)	1650 & 2000mg/kg (cat); 2725, 4700-5000mg/kg (rat), 5500mg/kg (mouse & dog), 6610mg/kg (guinea pig)
LD_{50} (skin)	9530mg/kg (rabbit)
LC_{50} (inhalation)	2725mg/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 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	
LC_{50} (Fish, 96hr)	>10,000mg/litre (Lepomis macrochirus), 40,760mg/litre (Oncorhynchus mykiss), 49,000-57,000mg/litre (Pimephales promelas), 16,000mg/litre (Poecilia reticulata)
EC_{50} (Crustacea, 48hr)	>20,000mg/litre (Artemia salina), 41,000-57,600mg/litre (Daphnia magna)
EC_{50} (Algæ)	6500-7500 & 24,000mg/litre (Selenastrum capricornutum),
EC_{50} (Bacteria)	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.

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***

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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 regulated for transport**
Marine Pollutant		not a marine pollutant
ERAP Required		**NO**

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 a 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 a 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. 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.*
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