

# Material Safety Data for: Diethylene Glycol

## 1. PRODUCT IDENTIFICATION

**Name** 2-hydroxyethyl ether  
**Synonyms** dihydroxydiethyl ether, 2,2-oxydiethanol  
**CAS#** 111-46-6  
**Product Uses** mfg of polyester resins, polyols, and other resins; antifreeze, dehydrating agent, component of inks, etc

## 2. INGREDIENTS

	%	TWAEV / TLV mg/m <sup>3</sup>	LD <sub>50</sub> ORAL	(mg/kg) SKIN	LC <sub>50</sub> ppm INHALATION
2-hydroxyethyl ether	100%	not listed	2300	11,890	1070

## 3. (a) HAZARDS SUMMARY

**Hazards, Quick Guide:** low fire hazard, but will burn in fire; toxic substances form in fire; may ignite on hot surface; toxic on ingestion

### Canada – WHMIS

Key:

**D 1B** (toxic on ingestion)

**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	little to no effect
Skin Absorption	slight; no toxic effects by this route
Eye Contact	may be slightly irritating
Inhalation	little to no effect; low vapour pressure makes vapour formation unlikely; diethylene glycol is used to create theatrical mist with no reported consequences
Ingestion*	ingestion in amounts similar to those producing intoxication with alcohol cause similar effects; headache, dizziness, drowsiness; <i>not a route of occupational exposure</i>

### Effects, Chronic Exposure

General	experimental long-term ingestion has produced renal stones & liver damage in rodents
Sensitising	not a sensitiser in humans or animals
Carcinogen/Tumorigen	not considered a tumorigen or a carcinogen in humans or animals
Reproductive Effect	no known effect in humans or animals
Mutagen	no known effect on humans or animals
Synergistic With	consumption of ethyl alcohol
LD <sub>50</sub> (oral)*	2300 & 23,700mg/kg (mouse), 3300 & 3400mg/kg (cat), 4400 & 26,900mg/kg (rabbit), 7800–15,650mg/kg (rat), 8000-9900mg/kg (dog), 7800 & 8000mg/kg (guinea pig)
LD <sub>50</sub> (skin)	11,890 & 13,300mg/kg (rabbit)
LC <sub>50</sub> (inhalation)	above 1070ppm (rat)

\*See NOTE in Part 9.

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

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

**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. PHYSICAL PROPERTIES**

Odour & Appearance	clear, colourless, odourless, viscous, hygroscopic liquid with a sweet taste
Odour Threshold	not known – odourless
Vapour Pressure	0.0057mmHg / 0.00076kPa (25°C / 77°F)
Evaporation Rate ( <i>Butyl Acetate = 1</i> )	0.001 – <i>not considered volatile</i>
Vapour Density (air = 1)	3.7
Boiling Range	246°C / 475°F
Melting Point	-10.5°C / 13°F – <i>supercools to well below this temperature</i>
Specific Gravity	1.118 (20/20°C)
Water Solubility	complete
Also soluble in	alcohols, ketones, ethers, esters; limited solubility in hydrocarbons
Viscosity	38centipoise (20°C / 68°F)
pH	none – ( <i>does not liberate hydrogen ions when dissolved</i> )
Conversion Factor	1ppm = 4.3mg/m <sup>3</sup>
Molecular Weight	106grams per mole

**6. FLAMMABILITY & FIRE FIGHTING**

Flash Point	124°C / 255°F (closed cup)
Autoignition Temperature	224°C / 435°F
Flammable Limits	1.6% – 10.8%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments, including highly irritating formaldehyde
Fire Fighting Precautions	foam, dry chemical, water fog, water spray – water jet spreads flames; Fire fighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge

**7. STABILITY / REACTIVITY**

Dangerously Reactive With	strong oxidising agents, including hypochlorites; reaction with powdered aluminium, powdered zinc, sodium, potassium, lithium or their hydrides releases hydrogen and creates a strong alkali; vigorous reaction with boron trichloride and aluminium chloride to produce corrosive hydrogen chloride gas
Also Reactive With	epoxides, strong acids, carbon disulphide, halogens and isocyanates
Stability	stable; will not polymerize
Decomposes in Presence of	air to form peroxides which may explode on distillation; peroxidation is more rapid in the presence of acid
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

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

**8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL**

ACGIH TLV	not listed – AIHA WEEL is 10 mg/m <sup>3</sup> / 2.3ppm
OSHA PEL	not listed
STEL	not listed
Ventilation	not required; if visible mist is generated, mechanical ventilation at source should be installed
Hands	no special protective gloves required; nitrile or butyl gloves are resistant to diethylene glycol
Eyes	safety glasses with side shields – <i>always protect the eyes</i>
Clothing	no special protective clothing required

**9. HANDLING & STORAGE**

Store in a dry environment, away from sources of open flame, oxidising agents and substances listed in Part 7.

This product may react with oxygen in the air to form explosive or flammable peroxides. Ensure that containers are full and tightly sealed. If prolonged storage of a part container is anticipated, flush headspace with dry nitrogen gas prior to sealing. Always ensure that containers, whether empty or full, or part full, are tightly sealed unless in use.

Avoid breathing product 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.

***NOTE on oral toxicity:** Diethylene glycol appears to be much more toxic in humans than to the laboratory animals used in the oral LD<sub>50</sub> tests (Part 3b). Obviously, LD<sub>50</sub> testing cannot be carried out on humans, but in 1937, 105 people (34 children, 71 adults) died after ingesting an elixir containing 72% diethylene glycol, 8% sulfanilamide and 20% flavours, saccharin, caramel, plus 10% water for 6-13 days. More recently, half of a small group of male prisoners who had ingested diethylene glycol for 2 years (in the form of a cleaning solution), were found to be suffering some neurological abnormalities. However, ingestion is not an expected route of entry for this industrial substance.*

**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 sand, sweep, shovel & store in closed containers for recycling or disposal

**11. DISPOSAL**

Waste Disposal	<b>do not flush to sewer</b> , recycle solvent if possible, if local regulations permit, may be put in sanitary landfill, may be incinerated in approved facility
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>

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## 12. ENVIRONMENTAL INFORMATION

Bioaccumulation	this product is rapidly excreted and/or metabolised and cannot bioaccumulate
Biodegradation	this product degrades readily in the presence of oxygen; a wide range of degradation rates are seen: 30% - 70% in 20 – 30 days
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 13 hours
Mobility in soil, water	this product is water soluble and will move readily in soil and water
<b>Aquatic Toxicity</b>	
LC <sub>50</sub> (Fish, 96hr)	>32,000mg/kg (gambusia affinis), >10,000mg/kg (leuciscus idus, 48hr), >5000mg/kg (carassius auratus, 24hr),
LC <sub>50</sub> (Crustacea, 24hr)	>10,000mg/kg (artemia salina), >10,000mg/kg (daphnia magna)
EC <sub>50</sub> (Bacteria)	29,228mg/litre (photobacterium phosphoreum, 15min), 40,000mg/litre (mixed bacterial culture)

## 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# 203-872-2)</b>

**Allowable Tolerances:** Diethylene glycol is exempted from the requirement of a tolerance when used as a deactivator for formulations before crop emerges from soil in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

**FIFRA Requirements:** Diethylene glycol is exempted from the requirement of a tolerance when used as a deactivator for formulations before crop emerges from soil in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

## 16. PREPARATION INFORMATION

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

File Name: **Diethyl-Gly**

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

Preparation Date: **June 2001**      Revision Date: **December 2003, October 2006, October 2009**

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