

1. Chemical Product and Company Identification

Product Name: DEG
Product Description: Diethylene Glycol
CAS No.: 111-46-6
Product Formulation: $\text{HO}(\text{C}_2\text{H}_4\text{O})_2\text{H}$
Chemical Family: Glycols
Common names: 2,2'-Oxydiethanol, 2-Hydroxyethyl ether, Bis(2-hydroxyethyl) ether, Diglycol

Recommended Use of the Chemical and Restrictions on Use Coolant and antifreeze; heat transfer agent; brake fluids Polyester, resins, wetting and plasticizing agents; solvent; humectant.

Supplier's Name Barus Golden

2. Hazards Identification

Emergency overview

Appearance: colorless viscous liquid.

Caution! May cause eye and skin irritation. May be harmful if swallowed. May cause central Nervous system depression. May cause kidney damage. Hygroscopic (absorbs moisture from the Air).

Target organs: kidneys, central nervous system, liver.

Potential health effects

Eye: may cause mild eye irritation.

Skin: may cause mild skin irritation. May be absorbed through the skin. Passage of diethylene.

Glycol into the body through the skin is possible, but it is unlikely that this would result in harmful Effects during safe handling and use.

Ingestion: may cause liver and kidney damage. May cause central nervous system depression, Characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to Respiratory failure. Human fatalities have been reported from acute poisoning.

Inhalation: may cause respiratory tract irritation. May be harmful if inhaled. Inhalation of Heated or misted form may cause pulmonary edema.

Chronic: adverse reproductive effects have been reported in animals. A long term rat feeding Study showed that 1% diethylene glycol in the diet over a 2-year period resulted in slight growth Depression, a few calcium oxalate bladder stones, minimal kidney damage, and occasional liver Damage. At 4% dietary level, there was increased mortality, a marked depression of growth rate, Bladder stones, severe kidney damage, and moderate liver damage. In addition, bladder tumors Appeared rather frequently.

Poisons Schedule (SUSMP): S6 Poison

3. Composition/Information on Ingredients	
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Components	CAS Number	Proportion
DiEthylene glycol	111-46-6	100%

4. Description of First Aid Measures

For advice, contact a Poisons Information Centre or a doctor.

Inhalation: Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact: If skin contact occurs, remove contaminated clothing and wash skin with running water. If irritation occurs seek medical advice.

Eye Contact: If in eyes, wash out immediately with water. In all cases of eye contamination it is a sensible precaution to seek medical advice.

Ingestion: Rinse mouth with water. If swallowed, give a glass of water to drink. If vomiting occurs give further water. Seek immediate medical assistance.

Indication of immediate medical attention and special treatment needed: Treat symptomatically. Following ingestion admission to hospital should be the first priority. Gastric lavage or emesis should be performed as soon as possible to minimise absorption and is recommended within four hours of ingestion. Gastric lavage or emesis should not be attempted unless medical expertise or adequate facilities are available. Ethanol may be given intravenously as an antidote to prevent build-up of toxic metabolites and increase excretion of unchanged ethylene glycol by the kidneys. Uraemia, pulmonary oedema and metabolic acidosis can occur and dialysis, preferably haemodialysis, may be employed to treat these complications and to remove ethylene glycol and its metabolites from the blood. Ethylene glycol can cause central nervous system depression and metabolic acidosis. Consider removal by gastric lavage. Blockade of the diacid/hydroxyacid metabolites may follow competitive inhibition of alcohol dehydrogenase with ethanol or 4-methyl pyrazole. Consider maintenance of a plasma ethanol level of 100 mg/dL to 150 mg/dL.

5. Fire Fighting Measures

Suitable Extinguishing Media:

Fine water spray, normal foam, dry agent (carbon dioxide, dry chemical powder).

Unsuitable Extinguishing Media:

Water jet.

Specific hazards arising from the chemical:
Combustible liquid.

Special protective equipment and precautions for fire-fighters:

On burning will emit toxic fumes, including those of oxides of carbon. Fire fighters to wear selfcontained breathing apparatus and suitable protective clothing if risk of exposure to vapour or products of combustion. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. If safe to do so, remove containers from the path of fire. Keep containers cool with water spray.

6. Accidental Release Measures

General information: use proper personal protective equipment as indicated in section 8.

Spills/leaks: absorb spill with inert material (e.g. Vermiculite, sand or earth), then place in

Suitable container. Clean up spills immediately, observing precautions in the protective Equipment section. Provide ventilation.

7. Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Avoid breathing vapors from heated material. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Wash clothing before reuse. Avoid breathing spray or mist.

Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed. Store protected from moisture.

8. Exposure Controls/Personal Protection

DiEthylene glycol (vapour): 8hr TWA = 52 mg/m³ (20 ppm), 15 min STEL = 104 mg/m³ (40 ppm), Sk
DiEthylene glycol (particulate): 8hr TWA = 10 mg/m³, Sk

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

STEL (Short Term Exposure Limit) - the airborne concentration of a particular substance calculated as a time-weighted average over 15 minutes, which should not be exceeded at any time during a normal eight hour work day. According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers.

'Sk' (skin) Notice - absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:

Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Workplace Exposure Standards. Vapour heavier than air - prevent concentration in hollows or sumps. DO NOT enter confined spaces where vapour may have collected. Keep containers closed when not in use.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE): The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, SAFETY SHOES, SAFETY GLASSES, GLOVES, RESPIRATOR.

Wear overalls, safety glasses and impervious gloves. Use with adequate ventilation. If determined by a risk assessment an inhalation risk exists, wear an organic vapour respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. Physical and Chemical Properties

Physical state:	Slightly Viscous Liquid
Color:	Colourless
Odor:	practically odorless
Molecular Formula:	C ₄ H ₁₀ O ₃
Solubility:	Miscible in water.
Specific Gravity:	1.11 @20°C Relative
Vapor Density (air=1):	3.66
Vapor Pressure (20 °C):	0.01 mm Hg @ 30 °C
Flammability Limits (%):	3.2-12.8 (vapour in air)
Autoignition Temperature (°C):	412
Boiling Point/Range (°C):	245
pH:	Not available
Viscosity:	0.30 cP @ 25 °C
Partition Coefficient:	log Pow = -1.36
Freezing Point/Range (°C):	-10

10. Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Excess heat, exposure to moist air or water.
Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, strong bases.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

11. Toxicological Information

RTECS#:

CAS# 111-46-6: ID5950000

LD50/LC50:

CAS# 111-46-6:

Draize test, rabbit, eye: 50 mg Mild;

Draize test, rabbit, skin: 500 mg Mild;

Oral, mouse: LD50 = 23700 mg/kg;

Oral, mouse: LD50 = 2300 mg/kg;

Oral, rabbit: LD50 = 4400 mg/kg;

Oral, rat: LD50 = 12565 mg/kg;

Oral, rat: LD50 = 12000 mg/kg;

Skin, rabbit: LD50 = 11890 mg/kg;

Oral, human: LDLo = 1000 mg/kg.

Carcinogenicity:

CAS# 111-46-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: The major hazard from diethylene glycol occurs following the ingestion of relatively large single doses... 105 fatalities among 353 people who ingested a solution of sulfanilamide in an aqueous mixture containing 72% diethylene glycol. The symptoms included nausea, dizziness, and pain in the kidney region. In a few days, oliguria (reduced urination) and anuria (complete suppression of urination), with death resulting from uremic poisoning (kidney failure) followed. Diethylene glycol-contaminated acetaminophen elixirs were the cause of at least 30 deaths from renal failure in Haitian children in June 1996. Delayed neurological effects including lethargy, 6th nerve palsy, dilated pupils, optic neuritis & cerebralatrophy occurred in a 7 1/2-year-old girl poisoned in this epidemic.

Teratogenicity: Oral, rat: TDLo = 50 gm/kg (Female 1-20 days after conception--Developmental abnormalities).

Reproductive Effects: Oral, rat: TDLo = 76420 mg/kg (Female 6-15 days after conception--Effects on embryo and fetus); Oral, mouse: TDLo = 334 gm/kg (Multigeneration--Maternal and embryonic effects).

Mutagenicity: No information found

Neurotoxicity: Rats and mice exposed to diethylene glycol at 5 mg/m3 for 3-7 months showed structural changes in CNS and endocrine and internal organs along with other pathological effects.

12. Ecological Information

Ecotoxicity

Persistence/degradability:

Avoid contaminating waterways.

Expected to be readily biodegradable.

Bioaccumulative potential: This product shows a low bioaccumulation potential.
96hr LC50 (fish): >10,000 mg/L (marine water); 8050 mg/L (fresh water).

13. Disposal Considerations

Disposal methods:

Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Normally suitable for incineration by an approved agent.

14. Transport Information

Road and Rail Transport

Not classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail; NON-DANGEROUS GOODS.

Marine Transport

Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; NON-DANGEROUS GOODS.

Air Transport

Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; NON-DANGEROUS GOODS.

15. Regulatory Information

US FEDERAL

TSCA

CAS# 111-46-6 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes CAS # 111-46-6: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 111-46-6 can be found on the following state right to know lists:

Pennsylvania, Minnesota.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 22 Harmful if swallowed.

Safety Phrases:

S 46 If swallowed, seek medical advice immediately and show this container or label.

WGK (Water Danger/Protection)

CAS# 111-46-6: 1

Canada - DSL/NDSL

CAS# 111-46-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

16. Other Information

Supplier Safety Data Sheet; 11/ 2010.

'Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet; US Dept. of Health & Human Services: Cincinnati, 2014. Product Name: DIETHYLENE GLYCOL Issued: 17/07/2014

Caution

The information contained in this Material Safety Data Sheet (MSDS) is believed to be correct since it was obtained from sources we believe are reliable. However no representation, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle, or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion.