

ETHYLENE GLYCOL

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: Ethylene glycol; 1,2-Ethanediol; 2-Ethoxyethanol

Chemical Family: Aliphatic dihydric alcohol

Chemical Formula: CH₂OHCH₂OH

Product Use: Laboratory reagent

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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients, %, TLV Units, CAS No: Ethylene glycol, 99, Not established, 107-21-1

PHYSICAL DATA

Physical State: Liquid

Odour and Appearance: Clear, colourless, syrupy liquid

Odour Threshold (ppm): 0.08 ppm to 25 ppm. Not reliable warning properties, thresholds vary widely.

Vapour Pressure (mm Hg): 0.05 mm Hg at 20 °C

Vapour Density (Air = 1): 2.14

Evaporation Rate (Bu ac = 1): < 0.1

Boiling Point (degrees C): 198 °C

Freezing Point (degrees C): -13 °C

pH: Neutral

Specific Gravity: 1.1135 at 20 °C

Coefficient of Water/Oil distribution: LogP(oct) = -1.93

SHIPPING DESCRIPTION

UN: Not regulated.

T.D.G. Class: Not regulated.

Pkg. Group: Not regulated.

REACTIVITY DATA

Incompatibility with other substances: Increased risk of fire and explosion with strong oxidizing agents, phosphorus pentasulphide. Decomposes violently with strong bases, strong acids, with increased temperature and pressure. Silvered copper wires carrying DC current will ignite on contact with ethylene glycol. Not corrosive to most metals; corrosive to aluminum above 100 °C.

Reactivity: Avoid temperatures above 111 °C, sparks and flame, all incompatible materials. Avoid generating mist.

FIRE AND EXPLOSION DATA

Flammability: Can probably burn if strongly heated. Vapors can travel to a source of ignition and flash back. Concentrated solutions in water may be flammable. Closed containers may rupture violently when heated.

Extinguishing Media: Alcohol or polymer foam, dry chemical powder, carbon dioxide, water. Water as spray or fog will cause frothing that will smother the fire. Water can also be used to cool containers and disperse vapours or flush spills away from ignition sources. Fight fire from a safe distance and from upwind. Firefighters must wear NIOSH/MSHA approved, full face-piece, positive-pressure self-contained breathing apparatus and chemical splash suit.

Flash Point (Method Used): 111 °C (CC)

Autoignition Temperature: 398 °C

Upper Explosion Limit (% by volume): 15.3

Lower Explosion Limit (% by volume): 3.2

Hazardous Combustion Products: CO, CO₂

Sensitivity to Impact: None identified.

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:

LD50: (oral, rat) 5.89 g/kg; (dermal, rabbit) 9.5 g/kg

LC50: Not available.

Effects of Acute Exposure to Product:

Inhaled: Concentrations of 56 ppm cause severe irritation of eyes, nose, throat, and respiratory tract. Because of low vapour pressure, concentrations at room temperature are normally too low to cause toxic effects. If heated, adverse effects, including drowsiness and CNS depression have occurred, without irritation.

In contact with skin: Toxic. May be harmful or fatal by skin absorption. Readily absorbed through broken skin, causing systemic poisoning. Absorption through intact skin not known, but animal studies indicate that prolonged skin contact can cause toxic effects, as in Ingested. Contact with vapour, mist or liquid may cause defatting, drying and cracking of skin. Prolonged or repeated contact may cause dermatitis.

In contact with eyes: Liquid, vapour or mist may cause irritation, redness and pain.

Ingested: Toxic. Ingestion of small quantities may cause restlessness, unsteady gait, drowsiness. Lethal dose reported to be 100 cc. Death results from respiratory or cardiac arrest. If the victim survives, kidney failure may occur in the next few days. Ethylene glycol poisoning occurs in three stages - CNS depression, cardiopulmonary failure and kidney failure.

Effects of Chronic Exposure to Product: Workers exposed to ~ 12 ppm for 22 h through 28 days experienced only mild throat irritation, slight headache, and low backache. Prolonged or repeated exposure causes blood changes, CNS toxicity, kidney damage. Symptoms include, headaches, lethargy, uremia. Skin sensitization may occur. Toxic exposure is primarily by inhalation or skin absorption.

Carcinogenicity: No human information available. Negative in animal testing. Not classifiable as human carcinogen (ACGIH).

Teratogenicity: No human information available. Possible animal teratogen; embryotoxic and teratogenic in animal studies at doses that were not maternally toxic.

Reproductive Effects: Some effects in animal testing.

Mutagenicity: No human information available. Negative in Ames test.

Synergistic Products: None known.

PREVENTIVE MEASURES

Engineering Controls: Local exhaust ventilation required.

Respiratory Protection: NIOSH/MSHA approved chemical cartridge respirator with organic vapour cartridges, or powered air-purifying respirator with organic vapour cartridges. For emergency or unknown concentrations, positive pressure, full-facepiece self-contained breathing apparatus.

Eye Protection: Chemical safety goggles, face shield.

Skin Protection: Butyl, nitrile, or natural rubber, neoprene, polyethylene, polyvinyl chloride, Teflon, Viton, Barricade, Saranex, 4H, or Trellchem HPS gloves. Impervious apron, boots, and other protective clothing sufficient to prevent contact.

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Other Personal Protective Equipment: An eyewash and safety shower should be nearby and ready for use.

Leak and Spill Procedure: Eliminate all sources of ignition. Ventilate area and restrict access. Restrict access to area of spill. Cleanup personnel must be thoroughly trained in the handling of hazardous materials, and must wear protective equipment and clothing sufficient to prevent any contact or inhalation. Mix with inert material. Transfer carefully into container and arrange removal by disposal company. Contaminated absorbent may pose the same hazards as the product. Wash site of spillage thoroughly with detergent and copious amounts of water.

Waste Disposal: Follow all federal, provincial and local regulations.

Handling Procedures and Equipment: VERY TOXIC (suspect reproductive hazard). Have all engineering controls operating before handling. Workers using this chemical must be properly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. Follow routine safe handling and good housekeeping procedures. Use the smallest amount possible for the purpose in an area with adequate ventilation. Avoid generating mists or vapours. Avoid inhalation and contact with skin and eyes. Keep away from incompatible materials. Do not return contaminated material to the original container. Empty containers may contain hazardous residues; treat with caution.

Storage Requirements: Store in cool, dry, well-ventilated area, out of direct sunlight, and away from heat or ignition sources and incompatible materials. Keep containers tightly closed. Protect from damage; inspect regularly for signs of damage. Storage facilities (shelves, floors) should be constructed of non-combustible materials, with raised sills and trenching to a safe location.

FIRST AID MEASURES**Specific Measures:**

Eyes: Immediately flush eyes with gently running water for fifteen to twenty (15 to 20) minutes, holding eyelids open during flushing. Take care not to flush contaminated water into the unaffected eye. Wear gloves to avoid contact. Get medical attention.

Skin: Remove contaminated clothing. Flush skin with plenty of running water for at least fifteen (15) minutes. Wear gloves to avoid contact. Get medical attention immediately. Decontaminate clothing before reuse.

Inhalation: IMMEDIATELY remove casualty from contaminated area to fresh air. Give oxygen and get medical attention for any breathing difficulty. If breathing has stopped, give artificial respiration. Get medical attention. Onset of symptoms may be delayed; if victim feels unwell during the next 24 hours, get medical attention immediately.

Ingestion: If casualty is alert and NOT convulsing, rinse out mouth with water, and give 2 to 4 glasses of water to drink to dilute. Get medical attention. If breathing has stopped, give artificial respiration. If spontaneous vomiting occurs, rinse mouth and give more water to drink. Onset of symptoms may be delayed; if victim feels unwell during the next 24 hours, get medical attention immediately.

REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997

Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 1, 1992

Sax, Lewis: Hawleys Condensed Chemical Dictionary, 11th ed., 1987

Suppliers Material Safety Data Sheets:

ADDITIONAL INFORMATION

Date Issued: 01-Nov-88

Revision: May 2013

Proposed WHMIS Designation: D2A (possible teratogen and reproductive toxin)

Prepared by: Caledon Laboratories Ltd. (905) 877-0101