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THE POWER OF THREE³

PHARMCO-AAPER

AND COMMERCIAL ALCOHOLS

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300

MATERIAL SAFETY DATA SHEETS

Manufacturer: PHARMCO-AAPER
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Diethylene Glycol (DEG)

1. CHEMICAL PRODUCT IDENTIFICATION

Product Name: Diethylene Glycol
Synonym(s): 2,2'-Oxydiethanol; 2,2'-Oxybisethanol; 2,2' Dihydroxydiethyl Ether; Gycol Ether; Glycoethyl Ether;
Molecular Formula: $O(HOCH_2CH_2)_2$
Molecular Weight: 106.12

2. COMPOSITION/INFORMATION ON INGREDIENTS

Weight % - Component - (CAS Registry Number)
100 Diethylene Glycol (111-46-6)

3. HAZARDS IDENTIFICATION

WARNING! HARMFUL IF SWALLOWED. MAY CAUSE IRRITATION TO SKIN AND EYES.

NFPA Hazard Ratings: Health - 1, Flammability - 1, Reactivity - 0

NOTE: NFPA ratings involve data and interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

Potential Health Effects

Inhalation: Low inhalation hazard unless heated because of low vapor pressure.

Ingestion: Low acute toxicity. Probable lethal dose to humans is 0.5-5 g/kg. Causes nerve depression, liver and kidney lesions and anuria (urination retardation). Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

Skin Contact: May be an irritant to skin on prolonged exposure.

Eye Contact: May be an irritant to eyes and surrounding tissue.

Chronic Exposure: Liver and kidney lesions and damage.

Aggravation of Pre-existing Conditions: Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

4. FIRST-AID MEASURES

Inhalation: Move to fresh air. Treat symptomatically. Get medical attention if symptoms occur.

Eyes: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Get medical attention if symptoms persist.

Skin: Wash with soap and water. Get medical attention if symptoms occur.

Ingestion: Induce vomiting as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

5. FIRE FIGHTING MEASURES

Extinguishing Media: water spray, dry chemical, carbon dioxide (CO₂), alcohol foam

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and protective clothing.

Hazardous Combustion Products: carbon dioxide, carbon monoxide

Unusual Fire and Explosion Hazards: none

6. ACCIDENTAL RELEASE MEASURES

Absorb spill with vermiculite or other inert material, then place in a container for chemical waste.

For Large Spills: Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams.

7. HANDLING AND STORAGE

Personal Precautionary Measures: Do not taste or swallow. Wash thoroughly after handling.

Prevention of Fire and Explosion: Keep from contact with oxidizing materials.

Storage: Keep away from food, drink and animal feeding stuffs. Keep container closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits:

- ACGIH Threshold Limit Value (TLV): diethylene glycol: not established
- OSHA (USA) Permissible Exposure Limit (PEL, 1989 Table Z-1-A values or section-specific standards): diethylene glycol: not established
- AIHA Workplace Environmental Exposure Level (WEEL): diethylene glycol: 50 ppm TWA, total; 10 mg/m³ TWA, aerosol only

Ventilation: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. Use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits, an approved respirator must be worn. Respirator type: organic vapor. If respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998.

Eye Protection: It is a good industrial hygiene practice to minimize eye contact.

Skin Protection: It is a good industrial hygiene practice to minimize skin contact.

Recommended Decontamination Facilities: eye bath, washing facilities

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: liquid

Color: colorless

Odor: odorless

Odor Threshold: not applicable

Specific Gravity at 20°C (68°F) (water = 1): 1.12

Vapor Pressure at 92°C (197°F): 1.33 mbar (1 mm Hg)

Vapor Density (Air = 1): 3.7

Evaporation Rate: not available

Boiling Point: 246°C (474°F)

Melting Point: -8°C (17.6°F)

Viscosity at 25°C (77°F): 0.3 mPa.s or cP

Solubility in Water at Ambient Temperature: complete

pH: not available

Octanol/Water Partition Coefficient: log P = -1.31, P = 0.05

Flash Point (Tag closed cup): 124°C (255°F)

Lower Flammable Limit at 182°C (360°F): 1.6 volume %

Upper Flammable Limit: 10.8 volume %

Autoignition Temperature (ASTM 659): 380°C (716°F)

Sensitivity to Mechanical Impact: insensitive at 100 kg-cm

Sensitivity to Static Discharge: not available

10. STABILITY AND REACTIVITY

Stability: stable

Incompatibility: Material can react violently with nitric acid, sulfuric acid, strong oxidizing agents.

Hazardous Polymerization: will not occur

11. TOXICOLOGICAL INFORMATION

Effects of Exposure:

Inhalation: Expected to be a low hazard for usual industrial or commercial handling by trained personnel.

Eyes: Low hazard for usual industrial handling or commercial handling by trained personnel.

Skin: Low hazard for usual industrial handling or commercial handling by trained personnel.

Ingestion: Harmful or fatal if swallowed. Hazard determination based on human case reports. Can cause kidney damage.

Acute Toxicity Data:

Oral LD-50 (rat): 16.6 g/kg

Inhalation LC-50: not available

Dermal LD-50 (rabbit): 11.9 g/kg

Skin irritation (guinea pig): slight

Definitions for the following section(s): LOEL = lowest-observed-effect level, NOAEL = no observed-adverse-effect level, NOEL = no-observed-effect level.

Subchronic Toxicity Data:

Oral study (32 days, rat): LOEL = 1 % (increase in weight: kidney) (highest dose tested); NOEL = 0.25 %

Oral study (90 days, rat): NOEL = 0.062 % (highest dose tested)

Developmental Toxicity Data:

Oral study (mouse): LOEL for maternal toxicity = 5000 mg/kg/day;

NOEL for maternal toxicity = 1250 mg/kg/day;

LOEL for developmental toxicity = 10,000 mg/kg/day;

NOEL for developmental toxicity = 5000 mg/kg/day

Mutagenicity/Genotoxicity Data:

Salmonella typhimurium assay (Ames test): negative (+/- activation)

CHO/HGPRT assay: negative (+/- activation)

Sister chromatid exchange (SCE) assay: negative (+/- activation) (in vitro)

Chromosomal aberration assay: negative (+/- activation) (in vitro)

12. ECOLOGICAL INFORMATION

Introduction: This environmental effects summary is written to assist in addressing emergencies created by an accidental spill which might occur during the shipment of this material, and, in general, it is not meant to address discharges to sanitary sewers or publicly owned treatment works.

Summary: Data for this material have been used to estimate its environmental impact. It has the following properties: a low biochemical oxygen demand and little potential to cause oxygen depletion in aqueous systems, a low potential to affect aquatic organisms, a low potential to affect algal growth, a low potential to affect the germination and/or early growth of some plants, some potential to biodegrade with acclimated microorganisms from activated sludge, a low potential to bioconcentrate. When diluted with a large amount of water, this material released directly or indirectly into the environment is not expected to have a significant impact.

Oxygen Demand Data:

ThOD: 1.51 g oxygen/g
BOD-5: 0.15 g oxygen/g
BOD-20: 0.32 g oxygen/g
COD: 1.06-1.49 g oxygen/g

Definitions for the following section(s): NOEC = no-observed-effect concentration,

Acute Algal Effects:

NOEC: 100 mg/l (highest concentration tested)

Acute Aquatic Effects Data:

24-h LC-50 (goldfish): >500 mg/l
24-h LC-50 (mosquito fish): >32000 mg/l
96-h LC-50 (Daphnia magna): >1000 microliter(s)/l (only dose tested)
96-h LC-50 (flatworm): >1000 microliter(s)/l (only dose tested)
96-h LC-50 (snail): >1000 microliter(s)/l (only dose tested)
96-h LC-50 (fathead minnow): >10000 mg/l
96-h LC-50 (rainbow trout): >1000 mg/l

Biodegradation: A 28-day test for ready biodegradability using unacclimated microorganisms showed 82-98% degradation of the test article as measured by a loss of dissolved oxygen.

Secondary Waste Water Treatment Effects: 5-hour IC-50: >5000 mg/l

7-Day Plant Germination Effects - No-adverse-effect concentration:

Ryegrass: >1000 microliter(s)/l
Radish: >100 microliter(s)/l
Lettuce: >1000 microliter(s)/l

13. DISPOSAL CONSIDERATIONS

Discharge, treatment, or disposal may be subject to national, state, or local laws. Incinerate.

Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

Not regulated.

15. REGULATORY INFORMATION

- This document has been prepared in accordance with the MSDS requirements of the OSHA Hazard

Communication Standard 29 CFR 1910.1200.

- OSHA Classification: hazardous
- This document has been prepared in accordance with the MSDS requirements of the WHMIS Controlled Products Regulation.
- WHMIS (Canada) Status: controlled
- WHMIS (Canada) Hazard Classification: D/1/B
- Carcinogenicity Classification (components present at 0.1% or more):
- International Agency for Research on Cancer (IARC): not listed
- American Conference of Governmental Industrial Hygienists (ACGIH): not listed
- National Toxicology Program (NTP): not listed
- Occupational Safety and Health Administration (OSHA): not listed
- Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372: none
- SARA (U.S.A.) Sections 311 and 312 hazard classification(s): immediate (acute) health hazard
- US Toxic Substances Control Act (TSCA): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.
- Canadian Environmental Protection Act (CEPA) and Domestic Substances List (DSL): This product is listed on the DSL or otherwise complies with CEPA new substance notification requirements.
- European Inventory of Existing Commercial Chemical Substances (EINECS): This product is listed on EINECS. EINECS Number: 2038722
- Australian Inventory of Chemical Substances (AICS) and National Industrial Chemicals Notification and Assessment Scheme (NICNAS): This product is listed on AICS or otherwise complies with NICNAS.
- Japanese Handbook of Existing and New Chemical Substances: This product is listed in the Handbook or has been approved in Japan by new substance notification.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal or greater than the reportable quantities (RQs) in 40 CFR 302.4. Components present in this product at a level which could require reporting under the statute are: **NONE**

16. OTHER INFORMATION

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.