



Material Safety Data Sheet

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Phone Calls: 301-816-8129
8 a.m. to 5 p.m. EST Mon. - Fri.

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RESIDUAL SOLVENT CLASS 2 - ETHYLENE GLYCOL

Catalog Number: 1601565

Revision Date:

June 22, 2009

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Common Name: Ethylene glycol

Manufacturer: U. S. Pharmacopeia

Responsible Party: Reference Standards Technical Services

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Product Use: USP Reference Standards and Authentic Substances are used for chemical tests and assays in analytical, clinical, pharmaceutical, and research laboratories.

SECTION 2 - HAZARD INFORMATION

EMERGENCY OVERVIEW: Poison. Irritant. Combustible.

This reference standard contains ethylene glycol in dimethyl sulfoxide (DMSO). The mixture has not been tested to determine specific physical hazards, but it is considered potentially combustible.

DMSO is an irritant and is rapidly absorbed through the skin. It may carry dissolved chemicals into the body through this route.

Ethylene glycol is a poison and irritant.

Adverse Effects: Adverse effects of DMSO may include redness, itching, or rash on skin; garlic-like taste or odor on breath and skin; swelling of face; troubled breathing; shortness of breath; nasal congestion; gastrointestinal disturbances; drowsiness; and headache. Adverse effects of ethylene glycol may include nausea, vomiting, headache, dizziness, tiredness, and red or raised skin. Possible allergic reaction to material if inhaled, ingested, or in contact with skin.

Overdose Effects: Overdose effects of ethylene glycol may include intoxication, nausea, vomiting, abdominal pain, weakness, dizziness, rapid breathing, fast heartbeat, stupor, seizures, and death.

Acute: Eye, skin, gastrointestinal and/or respiratory tract irritation.

Chronic: Possible hypersensitization; central nervous system abnormalities; blood disorders.

Medical Conditions Aggravated by Exposure: Hypersensitivity to material; kidney, respiratory, or neurological conditions.

Cross Sensitivity: n/f

Target Organs: Central nervous system and kidneys (Ethylene glycol)

For additional information on toxicity, see Section 11.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Common Name: Ethylene glycol**Formula:** See Composition**Synonym:** 1,2-Ethanediol; glycol alcohol (ethylene glycol)**Chemical Name:** 1,2-Dihydroxyethane in dimethyl sulfoxide**CAS:** See Composition**RTECS Number:** See Composition**Chemical Family:** Glycol (ethylene glycol)**Therapeutic Category:** Residual solvent**Composition:** Ethylene glycol (C₂H₆O; CAS # 107-21-1; RTECS # KW2975000) : 0.31%
Dimethyl sulfoxide (C₂H₆OS; CAS # 67-68-5; RTECS # PV6210000) : 99.69%

SECTION 4 - FIRST AID MEASURES

Inhalation: Causes irritation. Remove to fresh air.**Eye:** Causes irritation. Flush with copious quantities of water for at least 15 minutes.**Skin:** Causes irritation. Flush with copious quantities of soap and water. DMSO readily penetrates the skin and can enhance absorption of other chemicals.**Ingestion:** Causes irritation. Flush out mouth with water. Ethylene glycol is readily absorbed from the gastrointestinal tract.**General First Aid Procedures:** Remove from exposure. Remove contaminated clothing. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention. If person is not breathing, give artificial respiration. If breathing is difficult, give oxygen. Obtain medical attention.

Note to Physicians

Overdose Treatment: Treatment for ethylene glycol overdose should be symptomatic and supportive and may include the following:

1. Do not induce vomiting due to potential for CNS depression. Activated charcoal is not recommended. Gastric lavage should be considered if less than an hour after ingestion.
2. Maintain airway; assist ventilation if needed; administer oxygen.
3. Administer fomepizole or ethanol to saturate the enzyme alcohol dehydrogenase and prevent metabolism of ethylene glycol to its toxic metabolites.
4. Administer pyridoxine, folate, and thiamine to enhance metabolism of glyoxylic acid to nontoxic metabolites.
5. Monitor for the development of metabolic acidosis. Administer sodium bicarbonate only as a temporizing measure in managing severe and life-threatening acidosis and acidemia prior to hemodialysis.
6. Hemodialysis removes ethylene glycol and its toxic metabolites and corrects acidosis and electrolyte and fluid abnormalities.
7. Treat hypocalcemia with IV calcium gluconate or calcium chloride.

6. For seizures, administer intravenous benzodiazepine. If seizures recur, consider phenobarbital. Monitor for hypotension, dysrhythmias, respiratory depression, and need for endotracheal intubation. Evaluate for hypoglycemia, electrolyte imbalances, and hypoxia. [Poisoning and Drug Overdose 4th edition; Meditext 2009]

SECTION 5 - FIREFIGHTING MEASURES

Extinguisher Media: Water spray, dry chemical, carbon dioxide, or foam as appropriate for surrounding fire and materials.**Fire and Explosion Hazards:** Ethylene glycol is combustible and can react vigorously with oxidants, chlorosulfonic acid, oleum, sulfuric acid, perchloric acid, and phosphorus sulfide. DMSO is combustible and reacts violently with many acyl, aryl, and non-metal halides, boron compounds, and metal salts of oxoacids. Vapors may form explosive mixtures with air. Vapors may travel to sources of ignition and flash back. This mixture has not been tested.**Firefighting Procedures:** As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill Response: Wear approved respiratory protection, chemically compatible gloves, and protective clothing. Remove ignition sources. Ventilate enclosed spaces. Absorb with suitable material. Do not flush into a confined space such as a sewer. Avoid breathing vapors. Place spillage and all contaminated cleanup materials in an appropriately labeled container for disposal. Wash spill site.

SECTION 7 - HANDLING AND STORAGE

Handling: As a general rule, when handling USP Reference Standards avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Wash thoroughly after handling.

Storage: Store in tight, light-resistant container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

SECTION 8 - EXPOSURE CONTROL / PERSONAL PROTECTION

Engineering Controls: Engineering controls such as exhaust ventilation are recommended.

Respiratory Protection: Use a NIOSH-approved respirator, if it is determined to be necessary by an industrial hygiene survey involving air monitoring.

Gloves: Chemically compatible

Eye Protection: Safety goggles or glasses

Protective Clothing: Protect exposed skin.

Exposure Limits: Ethylene glycol :
NIOSH: CEILING 50 ppm
ACGIH: CEILING 100 mg/m³ (aerosol)

DMSO:
AIHA: 250 ppm

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Properties as indicated on the MSDS are general and not necessarily specific to the USP Reference Standard Lot provided.

Appearance and Odor: Colorless liquid.

Odor Threshold: n/f

pH: n/f

Melting Range: n/f

Boiling Point: n/f

Flash Point: n/f

Autoignition Temperature: n/f

Evaporation Rate: n/f

Upper Flammability Limit: n/f

Lower Flammability Limit: n/f

Vapor Pressure: n/f

Vapor Density: n/f

Specific Gravity: n/f

Solubility in Water: n/f

Fat Solubility: n/f

Other Solubility: n/f

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Partition Coefficient: n-octanol/water: n/f**Percent Volatile:** n/f**Reactivity in Water:** n/f**Explosive Properties:** n/f**Oxidizing Properties:** n/f**Formula:** See Composition**Molecular Weight:** n/f

SECTION 10 - STABILITY AND REACTIVITY

Conditions to Avoid: Light and ignition sources.

Incompatibilities: n/f

Decomposition Products: When heated to decomposition, material emits toxic fumes of SO_x. Emits toxic fumes under fire conditions.

Stable? Yes **Hazardous Polymerization?** No

SECTION 11 - TOXICOLOGICAL PROPERTIES

Oral Rat: Ethylene glycol :
LD50: 4700 mg/kg
DMSO :
14500 mg/kg

Oral Mouse: Ethylene glycol :
LD50: 5500 mg/kg
DMSO :
7920 mg/kg

Other Toxicity Data: Ethylene glycol :
Oral Guinea pig LD50 : 6610 mg/kg
Oral Dog LD50 : 5500 mg/kg
Skin Rabbit LD50 : 9530 mg/kg
DMSO:
Inhalation Rat LC50 : >2.0 mg/liter/40 hours
Skin Mouse LD50 : 50 grams/kg
Skin Rat LD50 : 40 grams/kg

Irritancy Data: Ethylene glycol :
Skin/Rabbit (Open Draize; 555 mg) : mild
Eye/Rabbit (Standard Draize; 500 mg/24 hours) : mild
Eye/Rabbit (Standard Draize; 1400 mg/6 hours) : moderate
DMSO :
Skin/Rabbit (Standard Draize; 500 mg/24 hours) : mild
Skin/Rabbit (Open Draize; 10 mg/24 hours) : mild
Eye/Rabbit (Standard Draize; 500 mg/24 hours) : mild

Corrosivity: n/f

Sensitization Data: Ethylene glycol :
Human Patch Test : not sensitizing
DMSO:
Guinea Pig Buehler Test : not sensitizing

Listed as a Carcinogen by: **NTP:** No **IARC:** No **OSHA:** No

Other Carcinogenicity Data: Ethylene glycol :
In a two-year study in mice given doses of ethylene glycol up to 6000 mg/kg/day (males) and 12000 mg/kg/day (females) in their diet, there was no evidence of carcinogenicity. A two-year study in rats and mice given diets containing ethylene glycol in doses up to 1000 mg/kg/day also showed no evidence of carcinogenicity.

Mutagenicity Data: Ethylene glycol :
Ethylene glycol was not mutagenic in the Ames test in *Salmonella typhimurium* with and without activation, in Chinese hamster V79 cells, in yeast *S. pombe*, or in the mouse lymphoma L5178Y assay, and it did not induce sister chromatid exchange or chromosomal aberrations in Chinese hamster ovary cells with and without activation. It was positive for mutagenicity in mouse lymphocytes and in a cytogenetic analysis in rats; caused DNA inhibition in human lymphocytes, and induced chromosomal aberrations in rat bone marrow cells and spermatids.
DMSO :
Dimethyl sulfoxide did not show a potential to induce gene mutations in bacterial or yeast cells, and was not

mutagenic in in vivo studies in Drosophila. Dimethyl sulfoxide did not induce micronuclei or sister chromatid exchange in mice or chromosomal aberrations or sister chromatid exchange in mammalian cells, but did induce an increase in chromosomal aberrations in rats. [EPA 2007]

Reproductive and Developmental Effects: Ethylene glycol :
Ethylene glycol did not cause developmental toxicity or teratogenicity in rabbits at maternally toxic doses of 2000 mg/kg. In studies with mice and rats gavaged with doses of 750 and 1250 mg/kg, respectively, there was an increase in malformations in the offspring but no apparent maternal toxicity. Doses of 500 mg/kg/day were fetotoxic in mice. Pregnant rats exposed to aerosol doses of 2500 mg/m³ had minimal maternal toxicity, no adverse effects on gestation, and no increase in malformations in the offspring, however, mice exposed to these conditions had maternal and fetal toxicity. Cutaneous doses of 3549 mg/kg/day caused no adverse maternal or developmental effects in mice.
DMSO :
Examination of the reproductive system during a 13-week inhalation repeated-dose toxicity study in rats revealed no abnormalities on estrus cycle in females, sperm count, motility or morphology in males, or on the reproductive organs of both sexes. In two oral developmental toxicity studies in rats, maternal effects included decreased food consumption and decreased body weight gain. Developmental effects included decreased fetal weights, higher rates of early resorptions per animal, increased total post-implantation loss, dilated renal pelvis, dilated ureters and reduced or delayed ossification of ribs. All of the fetal effects except dilated renal pelvis occurred at levels that demonstrated maternal toxicity. [EPA 2007]

SECTION 12 - ECOLOGICAL INFORMATION

Ecological Information: n/f

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal: Dispose of waste in accordance with all applicable Federal, State, and local laws.

SECTION 14 - TRANSPORT INFORMATION

Shipping Name: n/f

Class: n/f

UN Number: n/f

Packing Group: n/f

Additional Transport Information: n/f

SECTION 15 - REGULATORY INFORMATION

U.S. Regulatory Information: n/f

International Regulatory Information: Ethylene glycol :
EINECS # 203-473-3
DMSO :
EINECS # 200-664-3

SECTION 16 - OTHER INFORMATION

Revision: 22-Jun-09

Previous Revision Date: 08-Oct-03