

SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

SECTION 1: IDENTIFICATION

Product Name: GLYCOL ETHER PNP

Chemical Family: Aliphatic Propylene Glycol Ethers

CAS Number: 1569-01-3

Chemical Name: 2-Propanol, 1-Propoxy-

Synonyms: Propylene Glycol n-Propyl Ether, PNP, Dipropylene Glycol Monopropyl Ether

Company

Silver Fern Chemical, Inc.
2226 Queen Anne Avenue North
Suite #C
Seattle WA 98109, USA

Business Contact

Customer Service: 206-282-3376
info@silverfernchemical.com

24 Hour Emergency Contact

Infotrac 800-535-5053
Outside USA & Canada 352-323-3500

SECTION 2: HAZARD IDENTIFICATION

Emergency Overview

This material is HAZARDOUS by OSHA Hazard Communication definition.

Hazards

Flammable Liquid. Severe eye irritant. Skin irritant. Skin absorption hazard. May cause central nervous system depression.

HMIS (U.S.A.):

Health Hazard: 2
Fire Hazard: 2
Reactivity: 0
Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1
Flammability: 2
Reactivity: 0

Physical State

Liquid.

Color



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

Clear, colorless.

Odor

Mild odor.

Odor Threshold

No value available.

Potential Health Effects

Signs and Symptoms of Acute Exposure

See component summary.

1-Propoxy-2-Propanol 1569-01-3

May cause severe eye irritation. This substance may cause effects on the central nervous system, liver and kidneys. Skin absorption hazard.

Skin

Extensive and prolonged contact with skin may cause severe irritation. Skin absorption hazard.

Inhalation

High concentrations may cause central nervous system depression.

Eye

May cause severe eye irritation.

Ingestion

High doses may cause CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure). May damage the kidneys.

Chronic Health Effects

See component summary.

1-Propoxy-2-Propanol 1569-01-3

Prolonged or repeated inhalation or ingestion may result in kidney and liver changes.

Conditions Aggravated by Exposure

This material or its emissions may affect the central nervous system (CNS) and/or aggravate pre-existing CNS disorders. Prolonged observation may be indicated.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Component Name	CAS #	EU Inventory	Concentration Wt.%*	Risk	Symbol
1-Propoxy-2-Propanol	1569-01-3	216-372-4	>= 99.5	Not classified	None
2-Propoxy-1-Propanol	10215-30-2	Not Assigned	<= 5.0	Not classified	None

* Concentration of gaseous products or materials is given in Mole %
Compositions given are typical values not specifications.



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

SECTION 4: FIRST AID MEASURES

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. For specific information refer to the Emergency Overview in Section 3 of this MSDS.

Skin

Promptly remove soiled clothing/wash thoroughly before reuse. Wash skin thoroughly with mild soap and water. Flush with lukewarm water for 15 minutes. If sticky, use waterless cleaner first. Seek medical attention if ill effect or irritation develops.

Inhalation

If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain medical attention if breathing difficulty persists.

Eye

Immediately flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower lids. If pain or irritation persists, promptly obtain medical attention.

Ingestion

If large quantity swallowed, give lukewarm water (pint/ 1/2 litre) if victim completely conscious/alert. Do not induce vomiting. Risk of damage to lungs exceeds poisoning risk. Obtain emergency medical attention.

Note to Physician

If swallowed, DO NOT INDUCE VOMITING. Gastric lavage and cathartic indicated. Treat symptomatically. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5: FIRE FIGHTING MEASURES

Flammable Properties

Classification: OSHA/NFPA Class II combustible liquid.

Flash Point: ~ 48 °C (118.4 °F) (TCC)

Auto-Ignition Temperature: No Data Available.

Lower Flammable Limit: ~ 1.3 vol%

Upper Flammable Limit: ~ 16.9 vol%

Extinguishing Media

Suitable: SMALL FIRE: Use dry chemicals, CO₂, water spray or alcohol-resistant foam. LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.

Unsuitable: Do not use solid water stream/may spread fire.

Protection of Firefighters

Protective Equipment/Clothing: Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters protective clothing will only provide limited protection.

Fire Fighting Guidance: Fine sprays/mists may be combustible at temperatures below normal flash point. When heated



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

above the flash point, releases flammable vapors. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined. Vapors may be heavier than air. May travel long distances along the ground before igniting and flashing back to vapor source. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Hazardous Combustion Products: Thermal decomposition may produce carbon monoxide and other toxic vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Release Response

Extinguish all ignition sources. All equipment used when handling this product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Dike large spills and place materials in salvage containers. Water spray may reduce vapor; but may not prevent ignition in closed spaces.

SECTION 7: HANDLING AND STORAGE

Handling

For industrial use only. Keep container tightly closed when not in use. The potential for peroxide formation is enhanced when these solvents are used in processes such as distillation. Use only non-sparking tools. Properly ground containers before beginning transfer. When transferring propylene glycol ethers with flash points at or below 60 °C (140 °F) into fixed site vessels, the vessel should be purged and inerted prior to transfer. Propylene glycol ethers may be transferred into air atmospheres if the temperature of the product and the ambient temperature within the shipping container are both at least 16.7 °C (30 °F) less than the product's flash point. After loading, nitrogen blanketing is required if the contents of the transportation container could exceed a temperature of 16.7 °C (30 °F) less than the product flash point during any subsequent transportation activities. If the product flash point is less than 16.7 °C (30 °F) above either the ambient temperature of the transportation container or the storage temperature of the product, the container should be purged and inerted with nitrogen prior to loading and nitrogen blanketed after loading. Handle empty containers with care. Flammable/combustible residue remains after emptying. The purging of all empty shipping containers, regardless of the flashpoint, is recommended when received with air atmospheres. Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair. Use adequate personal protective equipment. Observe precautions pertaining to confined space entry.

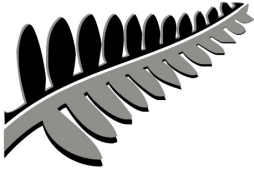
Storage

Storage under nitrogen atmosphere is recommended to minimize possible formation of highly reactive peroxides. Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents. Store in properly lined steel/stainless steel to avoid slight discoloration from mild steel/copper. Some plastics/rubbers are attacked by Glycol Ethers/Ether Esters. This product will absorb water if exposed to air.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls

General room or local exhaust ventilation is usually required to meet exposure limit(s).



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

Personal Protection

Inhalation A respiratory protection program that meets OSHA's 29 CFR 1910.134 or ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use.

Skin Wear chemical resistant gloves such as: Neoprene. When skin contact is possible, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. The equipment must be cleaned thoroughly after each use.

Eye Eye protection such as chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapor.

Additional Remarks

Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse.

Occupational Exposure Limits:

Component Name	Source / Date	Value	Type	Notation
1-Propoxy-2-Propanol	US (ACGIH)	N/L		
	US (OSHA)	N/L		
2-Propoxy-1-Propanol	US (ACGIH)	N/L		
	US (OSHA)	N/L		

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquid. Clear, colorless.

Odor: Mild odor.

Odor Threshold: No value available.

pH: Not applicable.

Boiling Point/Boiling Range: ~ 150 °C (302 °F) @ 760 mm Hg

Freezing Point/Melting Point: < -70 °C (-94 °F)

Flash Point: ~ 48 °C (118.4 °F) (TCC)

Auto-ignition: No Data Available.

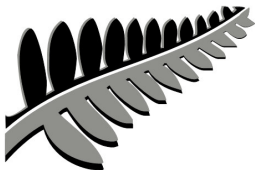
Flammability: OSHA/NFPA Class II combustible liquid.

Lower Flammable Limit: ~ 1.3 vol%

Upper Flammable Limit: ~ 16.9 vol%

Explosive Properties: No Data Available.

Oxidizing Properties: No Data Available.



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

Vapor Pressure: ~ 1.7 mm Hg @ 20 °C (68 °F)

Evaporation Rate: ~ 0.22 (butyl acetate = 1)

Relative Density: ~ 0.89 @ 20 °C (68 °F) (Water = 1.0 at 4 °C (39.2 °F))

Relative Vapor Density: ~ 4 @ 15 - 20 °C (59 - 68 °F) (Air = 1.0)

Viscosity: No Data Available.

Solubility (Water): Complete (In All Proportions).

Partition Coefficient (Kow): Log Pow = ~ 0.62

Additional Physical and Chemical Properties: Additional properties may be listed in Sections 3 and 5.

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability

This material is stable when properly handled and stored.

Conditions to Avoid

Extended contact with air or oxygen. The potential for peroxide formation is enhanced when these solvents are used in processes such as distillation. Heat, sparks, open flame, other ignition sources, and oxidizing conditions. Ignition may occur at temperatures below those published in the literature as autoignition or ignition temperatures.

Substances to Avoid

Strong bases.

Decomposition Products

Combustion may produce oxides of carbon and other toxic gases.

Hazardous Polymerization

Not expected to occur.

Reactions with Air and Water

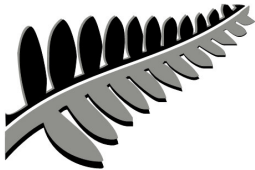
Not expected to occur.

SECTION 11: TOXICOLOGICAL INFORMATION

PRODUCT INFORMATION

Product Summary

Propylene glycol-n-monopropyl ether (PNP) presents low acute toxicity hazard either after exposure via ingestion or dermal applications. Due to its low vapor pressure, PNP is not thought to represent an inhalation hazard under conditions of ambient temperature. Although it is essentially nonirritating to the skin following short-term contact, prolonged or occluded contact can cause severe irritation. Skin absorption is evident. PNP is severely irritating to eyes and can cause corneal injury, which may be slow in healing. No data has been found on skin sensitization. Results from acute and repeat exposure studies in animals indicate that PNP may cause changes in the liver and/or kidney (based on increased organ weights) during prolonged or very high exposures. Reproductive toxicity has not been investigated. Based on the examination of reproductive organs from inhalation repeated-exposure studies, PNP is not expected to cause reproductive toxicity. In rats, PNP did not cause maternal toxicity, embryo or fetal toxicity, or developmental abnormalities following inhalation exposures up to 1500 ppm. However, PNP did cause maternal toxicity (central nervous system



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

depression and lethality) in rabbits following an inhalation exposure of 1500 ppm. Pregnancy and fetal parameters in the rabbit were unaffected at this concentration. PNP is not genotoxic in standardized in vitro mutagenicity tests.

COMPONENT INFORMATION

1-Propoxy-2-Propanol 1569-01-3

Acute Toxicity - Lethal Doses

LC50 (Inhl) Rat > 2230 PPM 6 HOURS

LD50 (Oral) Rat 2519 MG/KG BWT

LD50 (Skin) Rabbit. 3818 MG/KG BWT

Acute Toxicity - Effects

Inhalation May be irritating to the eyes. This substance is considered nontoxic by the inhalation route. May cause central nervous system depression.

Ingestion This substance is considered nontoxic by the oral route. High doses may cause CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure). At high doses, causes irritation of the stomach. May damage the kidneys.

Skin Contact This substance is considered nontoxic by the dermal route of exposure. Extensive and prolonged contact with skin may cause severe irritation. Skin absorption hazard. If the substance is heated or used in spray or aerosol applications, the potential for toxicity hazard from dermal exposure may be increased.

Irritation

Skin Not irritating to the skin following short-term contact. Extensive and prolonged contact with skin may cause severe irritation.

Eye Severe eye irritant. Undiluted or vapors of this substance can cause discomfort and pain with moderate to severe conjunctivitis (hyperemia and/or chemosis) and the possibility of corneal injury.

Sensitization

Specific data not available.

Target Organ Effects

Skin. Eye. Central nervous system. Liver. Kidneys.

Repeated Dose Toxicity

Repeated exposure of rats to PNP concentrations up to 300 ppm (6 hours/day) for 14 weeks by inhalation caused no observable adverse effects. At concentrations higher than 500 ppm (6 hours/day for 11 days), increased liver and kidney weights, CNS depression, and ocular irritation/lesions were noted. Therefore, PNP is considered a moderate risk to health following prolonged exposure via the inhalation route. No data was available for repeated oral or dermal exposures to PNP.

Reproductive Effects

The reproductive toxicity has not been investigated. Based on the examination of reproductive organs of rats from a 14-week inhalation repeated-exposure study, this substance is not expected to cause reproductive toxicity.

Developmental Effects

This substance did not cause maternal toxicity, fetal toxicity, or developmental abnormalities in rats receiving whole-body inhalation exposures up to concentrations of 1500 ppm. Although PNP did not cause fetal toxicity or developmental abnormalities in rabbits receiving inhalation exposures of 1500 ppm, there was clear evidence of maternal toxicity.



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

Genetic Toxicity

No evidence of genotoxicity in standard bacterial and mammalian test systems in vitro.

Carcinogenicity

No Data Available.

2-Propoxy-1-Propanol 10215-30-2

Repeated Dose Toxicity

Specific data not available. No known chronic health effects.

Carcinogenicity

Not listed by IARC, NTP, or OSHA.

SECTION 12: ECOLOGICAL INFORMATION

PRODUCT INFORMATION

Ecotoxicity

See component summary.

Environmental Fate and Pathway

See component summary.

COMPONENT INFORMATION

1-Propoxy-2-Propanol 1569-01-3

Ecotoxicity

Acute toxicity to fish

LC50 / 96 HOUR rainbow trout. > 100 mg/l

Summary: This material is not classified as harmful or toxic to fish.

Acute toxicity to aquatic invertebrates

LC50 / 48 HOUR waterflea. > 100 mg/l

EC50 / 48 HOURS waterflea. > 100 mg/l(immobilization)

Summary: This material is not classified as harmful or toxic to invertebrates.

Toxicity to aquatic plants

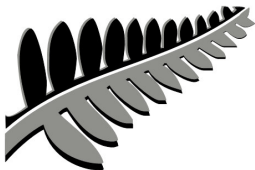
EC50 / 96 HOURS green algae (Selenastrum). 1,466 mg/lgrowth inhibition

Summary: This material is not classified as harmful or toxic to algae or higher aquatic plants.

Toxicity to microorganisms

No measured data available.

Summary: Based on this substance's ready biodegradability by microorganisms in wastewater treatment plant media, and its lack of toxicity to the unicellular algae, Selenastrum, the weight of evidence suggests this material is non-toxic to microorganisms.



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

Chronic toxicity to fish

No measured data available.

Summary: Quantitative structure-activity relationship (QSAR) models for this substance predicted a 30-day Chronic Toxicity Value of 232 mg/L to fish, based on an estimated log Kow value of 0.49. Not expected to exhibit chronic toxicity to fish.

Chronic toxicity to aquatic invertebrates

No measured data available.

Summary: Quantitative structure-activity relationship models for this substance predict a 16-d EC50 value of 59 mg/L to *Daphnia magna*, based on an estimated log Kow value of 0.49. Reproduction rate. Not expected to exhibit chronic toxicity to aquatic invertebrates.

Other Adverse Effects

No additional information available.

Environmental Fate and Pathway

Mobility

Transport between environmental compartments: This substance is highly soluble and is predicted to remain in solution and move readily through water columns and/or groundwater until biodegraded. It is expected to be highly mobile in soil and to readily leach from soil to groundwater where it can undergo biodegradation. This substance is unlikely to volatilize from moist soils or surface waters, but some volatilization from dry surface soils is possible.

Persistence and Degradability

Biodegradation: This substance is readily biodegradable with 64%-92% of the substance estimated to be degraded by microbes in 28 days. In air, the estimated photodegradation half-life is 4.9 hours and in water, the volatilization half-life from model waterways (lake and river) is estimated to be 22.9 and 2.1 years, respectively. However, due to its high water solubility and low vapor pressure, neither photodegradation nor volatilization will likely be significant removal mechanisms for this substance.

Bioaccumulation: This substance is not expected to bioaccumulate in aquatic or terrestrial organisms based on the estimated BCF (3.2).

2-Propoxy-1-Propanol 10215-30-2

Ecotoxicity

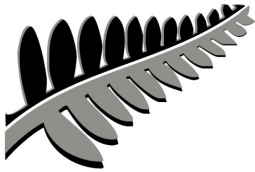
No Data Available.

Environmental Fate and Pathway

No Data Available.

SECTION 13: DISPOSAL CONSIDERATIONS

Contaminated product, soil, water, container residues and spill cleanup materials may be hazardous wastes. Comply with applicable federal, state, and local regulations.



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

SECTION 14: TRANSPORT INFORMATION

Special Requirements

If you reformulate or further process this material, you should consider re-evaluation of the regulatory status of the components listed in the composition section of this sheet, based on final composition of your product.

Proper Shipping Name Flammable liquids, n.o.s. (PROPYLENE GLYCOL N-PROPYL ETHER)

ID No. UN1993

Hazard Class 3

PG III

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: REGULATORY INFORMATION

Regulatory Status

<u>Country</u>	<u>Inventory</u>
Australia	AICS X
Canada	DSL X
Canada	NDSL
China	IECS X
European Union	EINECS X
European Union	ELINCS
European Union	NLP
Japan	ENCS X
Korea	ECL X
Philippines	PICCS X
United States	TSCA X

X = All components are included or are otherwise exempt from inclusion on this inventory.

If identified components of this product are listed under the TSCA 12(b) Export Notification rule, they will be listed below.

SARA 302/304

No chemicals in this material with known CAS numbers are subject to the reporting requirements of CERCLA.

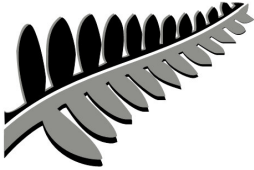
SARA 311/312

Based upon available information, this material is classified as the following health and/or physical hazards according to Section 311 & 312:

Immediate (Acute) Health Hazard.

Delayed (Chronic) Health Hazard.

Fire Hazard.



SILVER FERN CHEMICAL

Material Safety Data Sheet

GLYCOL ETHER PNP

SARA 313

This material does not contain any chemical components with known CAS numbers that exceed the De Minimis reporting levels established by SARA Title III, Section 313 and 40 CFR 372.

Component Reporting Threshold

State Reporting

This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

Massachusetts Substances List (MSL) - Extraordinarily hazardous substances must be identified when present in materials at levels greater than state specified criterion. The criterion is $\geq 0.0001\%$. Hazardous Substances (MSL-HS) on the MSL must be identified when present in materials at greater than the state specified criterion. The criterion is $\geq 1\%$. Components with CAS numbers present in this material, at levels specified in Section 2 - Composition do not require reporting under the statute.

Hazardous Substances listed by the State of Pennsylvania must be identified when present in materials at levels greater than the state specified criterion. The criterion is $\geq 1\%$. Components with CAS numbers in this material at a level which could require reporting under the statute are:

Dipropylene Glycol / CAS# 25265-71-8.

Propylene Glycol / CAS# 57-55-6.

A Volatile Organic Compound (VOC) is any volatile compound of carbon excluding methane, carbon monoxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, 1,1-trichloromethane, methylene chloride, (FC-23), (CFC-113), (CFC-22), (CFC-114), and (CFC-115). By this definition, this is a (VOC) material.

SECTION 16: OTHER INFORMATION

Effective Date: 10/10/2006

DISCLAIMER OF RESPONSIBILITY

The information on this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this MSDS information may not be applicable.

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