Material Safety Data Sheet
Propylene oxide

ACC# 96452

Section 1 - Chemical Product and Company Identification

MSDS Name: Propylene oxide
Catalog Numbers: AC149620000, AC149620010, AC149620025, AC149620050, AC149620500, AC149625000, AC220160000, AC220160010, AC220160050, O4332-1, O43321LC
Synonyms: Methyl ethylene oxide; Methyloxirane; 1,2-Epoxypropane.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
75-56-9	Propylene oxide	>98	200-879-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: -37 deg C.
Danger! Extremely flammable liquid and vapor. Vapor may cause flash fire. Causes severe eye and skin irritation with possible burns. Causes respiratory tract irritation. Harmful if inhaled or swallowed. May cause allergic skin reaction. May be harmful if absorbed through the skin. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause cancer based on animal studies. Elevated temperatures can cause polymerization. Avoid temperatures above 50°C/122°F.
Target Organs: Lungs, respiratory system, eyes, skin, mucous membranes.

Potential Health Effects
Eye: Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause blindness. Vapors may cause eye injury.
Skin: May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May be harmful if absorbed through the skin. Causes severe skin irritation and possible burns. May lead to the formation of blisters. May cause more severe response on covered skin (under clothing, gloves). Aqueous solutions may cause more severe effects including burns.
Ingestion: Harmful if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause central nervous system depression.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. Vapors may cause dizziness or suffocation. Odor is not an adequate warning of concentrations exceeding the exposure guideline.
Chronic: Prolonged inhalation may cause respiratory tract inflammation and lung damage. Prolonged or repeated skin contact may cause dermatitis. Lifetime inhalation studies in lab animals with propylene oxide suggest a weak carcinogenic effect.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid immediately.
Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: Evacuate area and fight fire from a safe distance. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Fire or excessive heat may result in violent rupture of the container due to bulk polymerization. Closed containers may rupture violently when heated. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Hazardous polymerization may occur under fire conditions.
Extinguishing Media: Use flooding quantities of water as spray. Use water spray, dry chemical, carbon dioxide, or alcohol-resistant foam.
Flash Point: -37 deg C (-34.60 deg F)

Autoignition Temperature: 449 deg C (840.20 deg F)
Explosion Limits, Lower:2.3 vol %
Upper: 37 vol %
NFPA Rating: (estimated) Health: 3; Flammability: 4; Instability: 2

Section 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. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Evacuate unnecessary personnel. Approach spill from upwind. Use water spray to cool and disperse vapors, protect personnel, and dilute spills to form nonflammable mixtures. Do not use clay-based absorbents. Ground and bond containers and handling equipment.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. This product may be under pressure; cool before opening. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Do not breathe vapor. Keep away from heat, sparks and flame. Use only with adequate ventilation or respiratory protection. Do not use air pressure to empty containers. Refrigeration helpful. Cool to 0°C before opening.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Storage under a nitrogen blanket has been recommended. Refrigeration has been recommended. Should not be exposed to temperatures above 122°F (50°C). Do not store product contaminated with water to prevent potential hazardous reaction. Propylene oxide reacts with water to produce propylene glycol, dipropylene glycol, tripropylene glycol and higher molecular weight polyglycols.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Propylene oxide	2 ppm TWA	400 ppm IDLH	100 ppm TWA; 240 mg/m3 TWA

OSHA Vacated PELs: Propylene oxide: 20 ppm TWA; 50 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles and face shield.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: colorless
Odor: ether-like - sweetish odor
pH: Not available.
Vapor Pressure: 442 mm Hg @ 20 deg C
Vapor Density: 2.0 (Air=1)
Evaporation Rate: Not available.
Viscosity: 0.28 cps @ 25 deg C
Boiling Point: 34 deg C
Freezing/Melting Point:-112 deg C
Decomposition Temperature: Not available.
Solubility: Soluble.
Specific Gravity/Density:0.830 @ 20/20°C
Molecular Formula:C3H6O
Molecular Weight:58.08

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Propylene oxide may polymerize violently especially in the presence of aqueous sodium hydroxide, chlorine, ammonia, strong oxidants, and acids.
Conditions to Avoid: Ignition sources, temperatures above 50°C (122°F), confined spaces.
Incompatibilities with Other Materials: Strong oxidizing agents, acids, bases, amines, ammonia, copper, copper alloys, iron, peroxides, catalytic metals, aluminum chloride, ethylene oxide + polyhydric alcohol, anhydrous metal chloride, clay-based absorbents, vermiculite.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Will occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 75-56-9: TZ2975000
LD50/LC50:
CAS# 75-56-9:
Draize test, rabbit, eye: 20 mg Severe;
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 50 mg/6M Severe;
Inhalation, mouse: LC50 = 1740 ppm/4H;
Inhalation, rat: LC50 = 4000 ppm/4H;
Oral, mouse: LD50 = 440 mg/kg;
Oral, rat: LD50 = 380 mg/kg;
Skin, rabbit: LD50 = 1500 uL/kg;
.
Dermal LD50 rabbit: 1244 mg/kg ation LC50 rat: 9.486 mg/l/4H ensitizing in guinea pigs per Dow Chemical.
Carcinogenicity:
CAS# 75-56-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 10/1/88
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

Epidemiology: Case reports of eczema & skin sensitization from exposure to propylene oxide have appeared in the published literature. One histopathology lab worker developed dermatitis on both hands after handling propylene oxide during a dehydrating step.
Teratogenicity: Birth defects are unlikely. Exposures having no effects on the mother should have no effects on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother.
Reproductive Effects: In animal studies, propylene oxide did not interfere with reproduction.
Mutagenicity: In vitro mutagenicity studies were positive. Animal mutagenicity studies were predominantly negative. In a fruit fly assay with exposures of 645 ppm, mutagenic effects were seen. The mechanism of genotoxicity probably includes binding of the reactive propylene oxide to DNA bases. There is evidence that thymidine is particularly susceptible to propylene oxide binding.
Neurotoxicity: Rats exposed to 1500 ppm, 6 hrs/day 5 days/week for 7 weeks, developed ataxia in the hindlegs. The main pathological change was axonal degeneration of the myelinated fibers in both the hindleg nerve and the fasciculus gracilis.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Goldfish: LC50 = 170 mg/L; 24 Hr; UnspecifiedFish: Bluegill/Sunfish: TLm = 215 mg/L; 96 Hr; Static bioassay @ 24°C If released to soil, propylene oxide is expected to be susceptible to leaching and chemical hydrolysis in moist soils. It is expected to evaporate relatively rapidly from dry soil surfaces; evaporation from wet soils may also occur, but at a rate diminished by leaching. If released to water, propylene oxide will hydrolyze. Volatilization of propylene oxide from the aquatic environment may be an important transport mechanism.
Environmental: If released to the atmosphere, propylene oxide will react in the vapor phase with photochemically produced hydroxyl radicals with an estimated half-life of approximately 30 days. Atmospheric removal by rainfall may occur. Adsorption to sediment, bioconcentration in aquatic organisms and reaction with photochemically produced hydroxyl radicals in water are not expected to be environmentally important fate processes.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	PROPYLENE OXIDE	PROPYLENE OXIDE
Hazard Class:	3	3
UN Number:	UN1280	UN1280
Packing Group:	I	I
Additional Info:		FLASH POINT -37C

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 75-56-9 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 75-56-9: Effective 10/4/82, Sunset 10/4/92

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

CAS# 75-56-9: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 75-56-9: 10000 lb TPQ

SARA Codes

CAS # 75-56-9: immediate, delayed, fire, reactive.

Section 313

This material contains Propylene oxide (CAS# 75-56-9, >98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 75-56-9 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 75-56-9 is listed as a Hazardous Substance 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# 75-56-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Propylene oxide, a chemical known to the state of California to cause cancer.
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:

T F+

Risk Phrases:

R 12 Extremely flammable.
R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 45 May cause cancer.
R 46 May cause heritable genetic damage.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 75-56-9: 2

Canada - DSL/NDSL

CAS# 75-56-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D1B, D2A, D2B.
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

CAS# 75-56-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/01/1999
Revision #4 Date: 4/19/2004