Material Safety Data Sheet

SPI #02524-AA, 02524-NA, 02524-AB Propylene oxide

Section 01 Identification

Date Effective.............. April 14, 2006
(most recent revision)

Chemical name .............. Propylene oxide

Synonyms..................... Methyl ethylene oxide; Methyloxirane;
1,2-Epoxypropane

Product or Trade Name.... SPI # 02524-AA, 02524-AB, and 02524-NA
Propylene oxide

CAS #......................... 75-56-9

Chemical Formula.......... CH₃CHCH₂O

Emergencies
Use Only #’s................. Contacting CHEMTREX 24 Hour Emergency
Worldwide phone : 1-(703)-527-3887
Worldwide FAX : 1-(703)-741-6090
Toll-free phone : 1-(800)-424-9300 USA only

Hazardous Material
Information System
USA

<table>
<thead>
<tr>
<th>Health</th>
<th>Fire Hazard</th>
<th>Reactivity</th>
<th>Personal Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

National Fire Protection Association USA

NFPS Rating:
Health: 3 Flammability: 4 Instability: 2

Section 2 Composition / Information on Ingredients
Section 3: Hazard Identification


Potential health effects (acute and chronic): May cause allergic skin reaction. Causes severe eye and skin irritation. Causes respiratory tract irritation. Aspiration hazard if swallowed; may enter lungs and cause damage. Harmful if inhaled, swallowed, or absorbed through skin. May cause cancer.

Target Organs: Lungs, respiratory system, eyes, skin, mucous membranes.

Symptoms of exposure:

Effects of eye exposure: Causes eye irritation. May cause burning sensation, redness, tearing, inflammation, and possible corneal damage. May cause blindness. Vapors may cause eye injury.

Effects of skin contact: May cause skin sensitization, an allergic reaction. May be harmful if absorbed through the skin. Causes severe skin irritation and possible burns, including blisters. May cause more severe response under clothing, gloves. Aqueous solutions may cause more severe effects, including burns.

Effects of ingestion: Harmful if ingested. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Aspiration of material into lungs may cause chemical pneumonitis, which may be fatal.

Effects of 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 a sufficient warning of concentrations exceeding the exposure guideline.

Chronic Effects: Prolonged or repeated skin contact may cause dermatitis. Chronic inhalation may cause respiratory tract irritation and lung damage. A possible weak carcinogenic effect has been noted in lifetime inhalation studies of laboratory animals.

Section 4: First Aid Measures

Eyes: Immediately flush thoroughly with water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Flush skin with plenty of soap and water for at least 15 minutes, while removing contaminated clothing and shoes. Wash clothing thoroughly before reusing. Get medical aid immediately.

Inhalation: Get medical aid immediately. Remove to fresh air immediately. Give artificial respiration if breathing has stopped. If breathing is difficult, give oxygen. Get medical aid immediately.

Ingestion: Potential for aspiration if swallowed. Do NOT induce vomiting, unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Notes to Physician: Treat symptomatically and supportively.
Section 5: Fire Fighting Measures

Flash Point ...................... -37 °F
Autoignition Temperature: ... 840.2 °F
Explosion Limits ... Lower ... 2.3 volume %
... Upper ... 37 volume %

Fire Extinguishing Media:
Use flooding quantities of water as spray. Use water spray, dry chemical, carbon dioxide, or alcohol-resistant foam.

Fire Fighting Procedure:
Extremely flammable liquid and vapor. Vapor may cause flash fire. Hazardous polymerization may occur under fire conditions. Evacuate area and fight fire from a safe distance. Wear self-contained breathing apparatus in pressure-demand, MSHA/NIOSH approved or equivalent, 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 cause violent rupture of the container due to bulk polymerization. Closed containers may rupture violently when heated. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors may collect in low or confined areas.

Section 6: Accidental Release Measures

Spill Response:

General Information: Wear suitable protective equipment listed under exposure/personal protection, including self contained breathing apparatus.

Spills/Leaks: Avoid runoff into storm sewers and ditches, which lead to waterways. Avoid all sources of ignition. Provide ventilation. Absorb spill with an absorbent, non-combustible material such as earth or sand (not clay-based or vermiculite) and place in suitable container for proper disposal, using a spark-proof tool. Approach spill from upwind. Use water spray to cool and disburse 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:
Use only in a well-ventilated area or with respiratory protection. Do not breathe vapor. Do not use air pressure to empty containers. Refrigerate to 0°C before opening. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Take precautionary measures against static discharges. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with heat, sparks and flame. Empty containers may contain residue - do not pressurize, or expose empty containers to heat, sparks or open flames. Keep tightly closed.

Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid ingestion or inhalation.

Storage:
Keep away from sources of ignition. Keep away from heat, sparks, and flame. Store in a tightly closed container. Store in a flammables area, away from incompatible materials. Store in cool, dry, well ventilated area. Storage under a
nitrogen blanket has been recommended. Should not be exposed to temperatures above 122 °F. Do not store product contaminated with water due to potential for hazardous reaction. Propylene oxide reacts with water to produce propylene glycol, dipropylene glycol, tripropylene glycol and higher molecular weight polyglycols.

Section 8: Exposure Controls and Personal Protection

An eyewash facility and a safety shower should be available. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment.

Airborne Exposure Limits:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>NIOSH</th>
<th>OSHA - Final PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene oxide</td>
<td>2 ppm</td>
<td>400 ppm TWA</td>
<td>100 ppm TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>240 mg/m3 TWA</td>
<td></td>
</tr>
</tbody>
</table>

OSHA Vacated PELs:

Propylene oxide: 20 ppm TWA; 50mg/m3 = TWA

Personal Protective Equipment:

Eyes: Wear chemical safety goggles and face shield as described by OSHA's eye and face protection regulations in 29 CFR 1910.134 and ANSI Z88.2 requirements or the European Standard EN149.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 and ANSI Z88.2 requirements or the European Standard EN149 whenever workplace conditions warrant a respirator's use.

Section 9: Physical and Chemical Properties

Boiling Point.(760mm Hg). 34°C
Formula Weight...(g/mol)... 56.08
pH (Liquids Only)....... not available
Melting Point............. -112°C
Vapor Pressure.(mm Hg)... 442 @20°C
Vapor Density/Air is 1... 2.0
Solubility In Water...... soluble
Appearance and Color..... colorless liquid
Specific Gravity(H2O=1): 0.63
Evaporation Rate........ not available
Odor...................... sweetish ether-like odor
Molecular Formula........ CH3CH2O

Section 10: Stability and Reactivity

Stable: Stable under normal temperatures and pressures.

Hazardous Polymerization: Will occur. May polymerize violently, especially in the presence of aqueous sodium hydroxide, chlorine, ammonia, strong oxidants, and acids.

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide,
irritating and toxic fumes and gases

- Conditions to avoid: Ignition sources, temperatures above 50°C or 122°F, confined spaces

Materials to avoid: 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

Section 11: Toxicological Information

RTECS #: CAS# 75-56-9: T22975000

Toxicity data: CAS# 75-56-9
Draize test, Rabbit, eye: 20mg Severe
Draize test, Rabbit, eye: 20mg/24H Moderate
Draize test, Rabbit, skin: 50mg/6M Severe
Inhalation, Mouse LC50: 1740 ppm/4H
Inhalation, rat LC50: 4000 ppm/8H
Oral, Mouse LD50: 440 mg/kg
Skin, Rabbit LD50: 1500µl/kg
Oral, rat LD50: 380 mg/kg

Carcinogenicity:
CAS# 75-56-9:
ACGIH: A3- Confirmed animal carcinogen with unknown relevance to humans
California: Carcinogen, initial date 10/1/88
NIOH: Potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible select carcinogen
IARC: Group 2B carcinogen

Epidemiology: Case reports of eczema and skin sensitization from exposure to propylene oxide have appeared in published literature.

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.

Reproductive effect:
Did not interfere with reproduction in animal studies.

Neurotoxicity: Rats exposed to 1500 ppm for 6 hours a day, 5 days a week, for 7 weeks developed ataxia in the hindlegs with axonal degeneration of the myelinated fibers in the hindleg nerve and fasciculus gracilis.

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.

Section 12: Ecological Information

Ecotoxicity:
Fish:
Goldfish: LC50 170 mg/L; 24h
Bluegill/Sunfish TLM 215 mg/l; 96h

Environmental:
Terrestrial: If released to the 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. If
released to water, propylene oxide will hydrolyze. Volatilization of propylene oxide from the aquatic environment may be an important transport mechanism.

Atmospheric: If released to the atmosphere, will react in the vapor phase with photochemically produced hydroxyl radicals with an estimated half-life of approximately 30 days. Removal via rainfall may occur. Bio-concentration in aquatic organisms, adsorption to sediment, or reaction with photochemically produced hydroxyl radicals in water are not expected to be environmentally important processes.

Section 13: Disposal Considerations

Consult state and local hazardous waste regulations to ensure complete and accurate classification.

US EPA guidelines for hazard classification determination are listed in 40 CFR Parts 261.3.

RCRA P-Series: Not listed
RCRA U-Series: Not listed

Section 14: Transport Information

<table>
<thead>
<tr>
<th>Shipping Name</th>
<th>US DOT</th>
<th>CAN.TDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Class</td>
<td>Propylene Oxide</td>
<td>Propylene Oxide</td>
</tr>
<tr>
<td>UN Number</td>
<td>UN1280</td>
<td>UN1280</td>
</tr>
<tr>
<td>Packing Group</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Flash Point</td>
<td>-37°C</td>
<td></td>
</tr>
</tbody>
</table>

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
Not listed

Section 12b
Not listed

TSCA Significant New Use Rule
Not listed on SNUR under TSCA.

SARA
CERCLA Hazardous Substances and Corresponding RQ's
CAS# 75-56-9: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 (TPQ)
CAS# 75-56-9: 10000 lb TPQ

SARA Codes
CAS# 75-56-9: acute, chronic, flammable, reactive

Section 313
CAS# 75-56-9 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. It is not listed as a Priority Pollutant or as a Toxic Pollutant under the CWA.

**OSHA:**
Not listed as 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.
This product contains Propylene oxide, a chemical know 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**

**Hazard Symbols:**
CAS# 85-56-9: T F+

**Risk Phrases:**
R12 Extremely flammable
R20 Harmful by inhalation
R21 Harmful in contact with skin
R22 Harmful if swallowed
R36 Irritating to eyes
R37 Irritating to respiratory system
R38 Irritating to skin
R45 May cause cancer
R46 May cause heritable genetic damage

**Safety Phrases:**
S45 In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).
S53 Avoid exposure - obtain special instructions before use

**WGK (Water Danger/Protection)**
75-56-9: 2

**Canada - DSL/NDSL**
75-56-9 is listed on Canada's DSL list.

**Canada - WHMIS**
Has WHMIS classification of B2, D1B, D2A, D2B

**Canada Ingredient Disclosure List**
Is listed on the Canadian Ingredient Disclosure List.

**Exposure Limits Around the World**

<table>
<thead>
<tr>
<th>Country</th>
<th>TWA (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>20</td>
</tr>
<tr>
<td>Belgium</td>
<td>20</td>
</tr>
<tr>
<td>Denmark</td>
<td>5</td>
</tr>
<tr>
<td>Finland</td>
<td>5</td>
</tr>
<tr>
<td>France</td>
<td>20</td>
</tr>
<tr>
<td>Germany</td>
<td>Carginogen</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>100</td>
</tr>
<tr>
<td>The Philippines</td>
<td>100</td>
</tr>
<tr>
<td>Russia</td>
<td>1 mg/m³</td>
</tr>
<tr>
<td>Sweden</td>
<td>5ppm; STEL 10 ppm</td>
</tr>
</tbody>
</table>

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Switzerland 2.5 ppm
Turkey 100 ppm
United Kingdom 20 ppm; STEL 100 ppm
Bulgaria, Colombia, Jordan, Korea - check ACGIH TLV OEL
New Zealand, Singapore, Vietnam - check ACGI TLV

Section 16: Other Information

Disclaimer of Liability:

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