Material Safety Data Sheet
Product No. 18601 Propylene Oxide, EM Grade
Issue Date (10-18-07)
Review Date (05-22-12)

Section 1: Product and Company Identification
Product Name: Propylene Oxide, EM Grade
Synonym: Methyloxirane, 1-2 Epoxypropane, Methyl Ethylene Oxide, Propylene Epoxide
Company Name
Ted Pella, Inc., P.O. Box 492477, Redding, CA 96049-2477
Domestic Phone (800) 237-3526 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
International Phone (01) (530) 243-2200 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
Chemtrec Emergency Number 1-800-424-9300 24 hrs a day.

Section 2: Composition / Information on Ingredients
<table>
<thead>
<tr>
<th>Principle Hazardous Component(s) (chemical and common name(s)) (Cas. No)</th>
<th>%</th>
<th>OSHA PEL mg/m³</th>
<th>ACGIH TLA mg/m³</th>
<th>NTP</th>
<th>IARC</th>
<th>OSHA regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene Oxide (75-56-9)</td>
<td>100</td>
<td>240</td>
<td>2 PPM</td>
<td>Yes</td>
<td>Group 2B</td>
<td>No</td>
</tr>
</tbody>
</table>

Section 3: Hazard Identification
Emergency overview
Appearance: Clear colorless liquid.
Immediate effects: Flammable Liquid and Vapor. Vapor explosion hazard, vapors can travel long distance and ignition and/or flash back may occur. Target organ effect (central nervous system), Toxic by ingestion and skin absorption. Aspiration Hazard. Possible cancer hazard. Elevated temperatures can cause hazardous polymerization. Avoid temperatures above 50 °C (122 °F).
Potential health effects
Primary Routes of entry: Inhalation, skin or eye contact, skin absorption, ingestion.
Signs and Symptoms of Overexposure: Effects include severe eye, skin and respiratory irritation or burns, skin rash, blistering. Effects of central nervous system depression include excitement, headache, dizziness, incoordination, narcosis, drunkenness, nausea, vomiting, collapse, coma and respiratory arrest. Effects from swallowing may include severe irritation and burns to the gastrointestinal tract, nausea, vomiting, diarrhea, central nervous system depression and difficulty breathing.
Eyes: Propylene oxide splashed in the eye can cause severe burning, tearing, redness, swelling and corneal burns. Propylene oxide vapors can also cause severe eye irritation.
Skin: Propylene oxide in liquid or solution form may be absorbed through the skin and produce toxic effects. Repeated exposure can result in significant skin absorption. Propylene oxide in contact with the skin may cause severe skin irritation and blistering. May cause burns, ulcers and superficial scarring with prolonged contact.

Ingestion: Ingestion of propylene oxide can cause gastrointestinal irritation, nausea, vomiting and diarrhea. Aspiration of propylene oxide into the lungs can cause pneumonitis which can be fatal.

Inhalation: Excessive inhalation of vapors can cause nasal and respiratory irritation, central nervous system depression, including dizziness, weakness, fatigue, nausea, headache, possible unconsciousness and even death.

Chronic Exposure: Repeated or prolonged exposure may cause delayed secondary burns. May cause heritable genetic damage. May cause cancer. Studies on animals have shown chronic effects such as loss of body weight, gastric irritation and liver injury. Studies on animals have shown chronic effects such as growth depression, pulmonary edema, lung and liver injury and death.

Chemical Listed As Carcinogen Or Potential Carcinogen: NTP: Classified as anticipated human carcinogen. IARC: Classified as probable human carcinogen, 2B. OSHA: Not classified. ACGIH: Not classified.

See Toxicological Information (Section 11)

Potential environmental effects
See Ecological Information (Section 12)

Section 4: First Aid Measures
If accidental overexposure is suspected
Eye(s) Contact: Immediately flush eyes with large amounts of water for at least 15-20 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.
Skin Contact: Remove contaminated clothing and shoes. Immediately wash exposed area with large quantities of mild soap and water. Flush with lukewarm water for at least 15 minutes. Seek prompt medical attention.
Inhalation: Remove exposed person to fresh air. If breathing has stopped, give artificial respiration, then oxygen if needed. Contact physician immediately.
Ingestion: Administer one pint of lukewarm water. Do not induce vomiting; risk of damage to lungs exceeds poisoning risk. Obtain immediate emergency medical treatment.

Note to physician
Treatment: ND
Medical Conditions generally Aggravated by Exposure: ND

Section 5: Fire Fighting Measures
Flash Point: Tag Open Cup: <-35 °F / <-37.2 °C. Tag Closed Cup: -35 °F / -37.2 °C
Flammable Limits: In air: Lower, 2.3% (V) Estimated. Upper, 37% (V) Estimated.
Auto-ignition point: 840 °F (449 °C)
Fire Extinguishing Media: Dry chemical; Alcohol resistant foam; Carbon dioxide. Water spray/fog can be used for cooling.
Special Fire Fighting Procedures: Wear NIOSH approved self contained breathing apparatus (SCBA) with a full face piece operated in the pressure-demand or positive pressure mode. Fight fires from a safe distance/protected location. Heat may build
pressure in a rupture closed containers. If recommended foam is not available, cut off the supply of fuel to the fire, maintain water spray to prevent spreading and allow fire to burn out.

Unusual Fire and Explosion Hazards: Propylene Oxide releases flammable vapors. Hazardous combustion products: Incomplete combustion will generate highly poisonous carbon monoxide and perhaps other toxic vapors.

DOT Class: Flammable, 3

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**Section 6: Accidental Release Measures**

Steps to be Taken in Case Material is Released or Spilled: Release of propylene oxide may create fire or explosion hazard. Evacuate all nonessential personnel. Extinguish all ignition sources. Clean up personnel must be equipped with proper protective equipment. Blanket spill with water to reduce vapors. For small spills, absorb liquid with vermiculite and place into containers for later disposal. Do not use clay based absorbents. Release of propylene oxide may create fire or explosion hazard. Evacuate all nonessential personnel. Extinguish all ignition sources. Clean up personnel must be equipped with proper protective equipment. Blanket spill with water to reduce vapors. For small spills, absorb liquid with vermiculite and place into containers for later disposal. Do not use clay based absorbents. The contaminated product, soil or water intended for disposal should be handled as hazardous waste due to potentially low flashpoint.

**Waste Disposal Methods:** Dispose of waste according to Federal, State and Local Regulations.

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**Section 7: Handling and Storage**

Precautions to be taken in Handling and Storage: STORAGE SEGREGATION: Store propylene oxide in a cool, properly ventilated area away from incompatible chemicals, heat, sparks, open flame, static build-up and strong oxidizing agents. Store only in highly closed containers. Store in Carbon Steel or Stainless Steel containers. Outside or detached storage is preferred. Preplan handling and emergency response procedures prior to use. Protect containers from physical damage and regularly inspect them for cracks, leaks or faulty valves. Use only non sparking tools and equipment when opening and closing containers. Container and system must be electrically grounded before unloading. Dry inert gas blanketing should be used to reduce possibility of flammable vapor mixtures in storage. Store in accordance with 29 CFR 1910.106

Storage temperature: Store propylene oxide in a cool

Storage Pressure: NA

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**Section 8: Exposure Controls / Personal Protection**

**Engineering Controls**

Ventilation required: All engineering systems should be of appropriate explosion proof design (e.g. NEC Standards, NFPA, etc). Propylene oxide must be used in closed engineering systems because of its flammability/ explosibility hazard. This prevents dispersion of this highly flammable gas into work area. Install and operate general and local ventilation systems powerful enough to maintain airborne levels of propylene oxide below the PEL (20ppm 8 hr TWA). Ventilation equipment must be explosion proof.

**Personal Protection Equipment**
Respiratory protection: Where the potential exists for exposures over 20ppm, use a MSHA/NIOSH approved, supplied air respirator with full face piece or use a NSHA/NIOSH approved self containing breathing apparatus (SCBA) operated in positive pressure mode. Air purifying respirators are ineffective and must not be used. Protective gloves: Wear protective gloves, material as Butyl rubber, Polyethylene, Viton, Neoprene, Natural rubber (latex) or Nitrile/butadiene rubber. Skin protection: When handling propylene oxide, wear an impervious protective suit, in addition to gloves, boots and full head and face protection. Eye protection: Eye protection, including splash proof goggles and face shield, must always be worn when the possibility exists for eye contact due to splashing or sprayed liquid. Do not wear contact lenses. Additional clothing and/or equipment: When handling propylene oxide, wear an impervious protective suit, in addition to gloves, boots and full head and face protection. The equipment must be thoroughly cleaned after each use. Emergency eyewash stations and safety showers should be available in all areas of use and handling.

**Exposure Guidelines**
See Composition/Information on Ingredients (Section 2)

### Section 9 Physical and Chemical Properties
Appearance and Physical State: Clear colorless liquid. Odor (threshold): Sweet ether like odor. Threshold: ND Specific Gravity (H₂O=1): 0.824@3.89°C (39.00°F). Vapor Pressure (mm Hg): 440.7 °C mm Hg. Vapor Density (air=1): 2.0 Percent Volatile by volume: 100%

Evaporation Rate (butyl acetate=1): 33.7
Boiling Point: 93.6 °F / 34.2 °C
Freezing point / melting point: -169 °F (-111.7 °C).
PH: NA
Solubility in Water: 39.5% @ 20 °C.
Molecular Weight: 58.08 grams/mole.

### Section 10: Stability and Reactivity
Stability: Stable Conditions to Avoid: Avoid temperatures above 50 °C (122 °F). Avoid moisture. Avoid two phase storage with water, a slow exothermic reaction may be initiated. Contact with incompatible chemicals. Prevent exposure to any and all sources of ignition such as heat, sparks, open flame, etc. Avoid oxidizing conditions. Materials to Avoid (Incompatibility): Strong acids, bases, peroxides, clay-based adsorbent materials anhydrous metal chlorides, copper and its alloys, brass, bronze and other acetylide forming metals. Hazardous Decomposition Products: Under fire conditions carbon monoxide and carbon dioxide. Hazardous Polymerization: May polymerize on exposure to excessive heat, peroxides, acids, alkalis, or amines.
Section 11: Toxicological Information
Results of component toxicity test performed: IDLH: 400 ppm. LD50: 300-1000 mg/kg, Rat-Oral. LD50 Rabbit-Dermal, 950-1240 mg/Kg. LC50 (4 HOUR): 4000 PPM Rat-Inh Sensitization: Yes.
Teratogenicity: No teratogenic effects have been reported.
Reproductive Toxicity: Reproductive effects have been shown in experimental animals exposed to propylene oxide.
Mutagenicity: DNA damage and chromosomal aberrations have been shown in experimental animals exposed to propylene oxide.
Human experience: Toxic or Harmful if swallowed or absorbed through skin. Cause skin burns.
This product does not contain any compounds listed by NTP or IARC or regulated by OSHA as a carcinogen. Propylene Oxide is a possible cancer hazard.

Section 12: Ecological Information
Ecological Information: Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested)
LC50 rainbow trout (Oncorhynchus mykiss): 96 h: 52 mg/L. Other fish: 96 h: 52-350mg/L. Biodegradation: 93-98%, Exposure Time: 28 d, Method: OECD 301C Test. Chemical Fate Information: Stability in water (1/2 life) 11.6 d; pH 7-9. Theoretical Oxygen Demand: 2.21 mg/mg

Section 13 Disposal Considerations
RCRA 40 CFR 261 Classification: Keep out of sewers, ground and any bodies of water. Contact a professional licensed disposal service.
OSHA DESIGNATIONS: Specifically regulated substance - NO 40 CFR 302.4 Federal, State and local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

Section 14: Transportation Information
US DOT Information: Proper shipping name: Propylene Oxide
Hazard Class: 3
Packaging group: I
UN Number: UN1280
IATA: Proper shipping name: Propylene Oxide
Hazard Class: 3
Packaging group: I
UN Number: UN1280
Domestic shipments only:
IMO: Proper shipping name: Propylene Oxide
Class: 3
UN Number: UN1280
Packing group: I
Marine Pollutant: No
Canadian TDG: Propylene Oxide
Section 15: Regulatory Information

United States Federal Regulations
SARA: Sections 311 and 312: Fire Hazard, Yes. Acute Health Hazard: Yes. Chronic
Health Hazard, Yes. Reactive Hazard, No. Sudden Release of Pressure Hazard, No.
(From literature)
SARA Title III: Section 302 and 313: Propylene Oxide (75-56-9)
RCRA: NIF
TSCA: All components of this product are on the TSCA Inventory or are exempt from
TSCA Inventory requirements under 40 CFR 720.30
CERCLA: RQ (Reportable Quantity) 100 lbs (45.4 Kg).

State Regulations
California Proposition 65: WARNING: This product contains a chemical(s) known to the
State of California to cause cancer. Propylene Oxide (75-56-9).

International Regulations
Canada WHMIS: Classification codes: B2, D1B, D2A, D2B
All substances contained in this product are listed on the Canadian Domestic Substances
List (DSL) or are not required to be listed.
Europe EINECS Numbers: This product is on the EINECS Inventory. EC# 200-879-2

Section 16: Other Information
Label Information: Flammable liquid and vapor, Target Organ Effect, Harmful by
ingestion and inhalation, Toxic by skin absorption. Causes serious eye damage.
European Risk and Safety Phrases: ND
European symbols needed: ND
Canadian WHMIS Symbols: ND
NFPA Hazard Rating: Health: 3 Fire: 4 Reactivity: 2
HMS® Hazard Rating: Health: 3 Chronic Health * Flammability: 4 Physical Hazards 0
* Chronic (long-term) health effects may result from repeated overexposure.
(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

Abbreviations used in this document
NE= Not established
NA= Not applicable
NIF= No Information Found
ND= No Data

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