

Standard Operating Procedure

Propylene oxide

This SOP is not complete until it has been signed and dated by the PI and relevant lab personnel.

Print a copy and insert into your
Laboratory Safety Manual and Chemical Hygiene Plan.
Refer to instructions for assistance.

Department:	Chemistry & Biochemistry – Chemical Engineering
Date SOP was written:	December 14, 2012
Date SOP was approved by PI/lab supervisor:	January 18, 2013
SOP reviewed by:	Alessandro Moretto, Chem. Lab. Safety Officer
Principal Investigator:	Prof. Susannah Scott
Internal Lab Safety Coordinator/Lab Manager:	Stephanie Goubert-Renaudin
Lab Phone:	805-893-8941
Office Phone:	805-893-7403
Emergency Contact:	EH&S 24 hour line: 805-893-3194 <i>(Name and Phone Number)</i>
Location(s) covered by this SOP:	ESB 3324 and 3328 <i>(Building/Room Number)</i>

Type of SOP: Process Hazardous Chemical Hazardous Class

Purpose

Propylene oxide is a **flammable**, **acute toxin** and a possible **carcinogen**. The majority of propylene oxide is used for the production of polyurethane plastics.
Propylene oxide is very hazardous if ingested, irritant to skin and eye and very harmful if inhaled.

Physical & Chemical Properties/Definition of Chemical Group

CAS#: 75-56-9

Class: **Acute toxin, highly flammable, possible carcinogen**

Molecular Formula: CH₃CHCH₂O

Form (physical state): liquid

Color: clear

Boiling point: 34°C

Potential Hazards/Toxicity

Very hazardous if ingested. Irritant of skin and eyes. Very harmful if inhaled. Propylene oxide is toxic to lungs, mucous membranes and repeated or prolonged exposure can produce targeted organ damage

Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness. Symptoms of overexposure may be headache and dizziness. Over exposure may also cause moderate to severe erythema (redness) and moderate edema (raised skin).

Propylene oxide has an acute oral toxicity of (LD50) 380 mg/kg [Rat].

Personal Protective Equipment (PPE)

Respirator Protection

Use a full-face respirator with multi-purpose combination (US) respirator cartridges as a backup to engineering controls.

Respirators should be used only under any of the following circumstances:

- As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
- When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
- Regulations require the use of a respirator.
- An employer requires the use of a respirator.
- There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
- As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by EH&S. This is a regulatory requirement.

Hand Protection

Gloves must be worn. [Butyl gloves](#) are recommended. Use proper glove removal technique to avoid any skin contact.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with Propylene oxide.

Refer to glove selection chart from the links below:

http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

Eye Protection

ANSI approved properly fitting safety glasses or chemical splash goggles.

Skin and Body Protection

Lab coats must be worn and be appropriately sized for the individual and buttoned to their full length.

Hygiene Measures

Wash thoroughly and immediately after handling. Remove any contaminated clothing and wash before reuse.

Engineering Controls

Handle using a chemical fume hood.

First Aid Procedures

If inhaled

Move into the fresh air immediately and give oxygen. If not breathing give artificial respiration. Seek medical attention immediately.

In case of skin contact

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash any contaminated clothing before reuse. Thoroughly clean shoes before reuse. Seek medical attention immediately.

In case of eye contact

Check for and remove any contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Seek immediate medical attention and continue eye rinse during transport to hospital.

If swallowed

Do NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. Seek medical attention immediately.

Special Handling and Storage Requirements

Precautions for safe handling: Avoid contact with skin and eyes and inhalation. Avoid breathing vapors, mist, or gas. Use only with adequate ventilation or respiratory protection. Keep away from heat or sources of ignition. Prevent any build-up of electrostatic charge.

Conditions for safe storage: Flammable materials should be stored in a flammable storage cabinet. Keep container tightly closed in a cool, dry, and well-ventilated place away from incompatible materials and conditions. Avoid dust generation, moisture, and heat. Keep cool and protect from sunlight.

Spill and Accident Procedure

Chemical Spill Dial **9-911** and EH&S (805-893-3194)

Spill – Assess the extent of danger. Help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

Small (<1 L) – If you have training, you may assist in the clean-up effort. Use appropriate personal protective equipment and clean-up material for chemical spilled. Double bag spill waste in clear plastic bags, label and take to the next chemical waste pick-up.

Large (>1 L) – Dial **9-911** from campus phones (and **805-893-3446** from a cell phone) and EH&S (805-893-3194) for assistance.

Chemical Spill on Body or Clothes – Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention. *Notify supervisor and EH&S immediately.*

Chemical Splash Into Eyes – Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye open. Seek medical attention. *Notify supervisor and EH&S immediately.*

Medical Emergency Dial **9-911**

Life Threatening Emergency, After Hours, Weekends and Holidays – Dial **9-911** (or 805-893-3446 from a cell phone) or go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All Serious injuries must be reported to EH&S within 8 hours.*

Non-Life Threatening Emergency – Go to the Student Health Building, Building 588 (phone number: 893-5361, hours: M, T, R, F 8am-4.30pm, W 9am - 4.30pm, R 5pm to 7pm by appointment). After hours go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All serious injuries must be reported to EH&S within 8 hours.*

Needle stick/puncture exposure (as applicable to chemical handling procedure) – Wash the affected area with antiseptic soap and warm water for 15 minutes. For mucous membrane exposure, flush the affected area for 15 minutes using an eyewash station. Page the needle stick nurse \ and then enter your extension. After hours go to the nearest emergency room: the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411). *Note: All needle stick/puncture exposures must be reported to EH&S within 8 hours.*

Decontamination/Waste Disposal Procedure

Use proper personal protective equipment. Call EH&S (805-893-3194) if assistance is needed. Properly dispose chemical and contaminated disposables as hazardous waste following the guidelines below.

General hazardous waste disposal guidelines:

Label Waste

- Affix an on-line hazardous waste tag on all waste containers as soon as the first drop of waste is added to the container

Store Waste

- Store hazardous waste in closed containers, in secondary containment and in a designated location
- Waste must be under the control of the person generating & disposing of it

Dispose of Waste

- Dispose of regularly generated chemical waste within 90 days
 - Call EH&S for questions
 - Empty Containers
 - Dispose as hazardous waste if it once held extremely hazardous waste (irrespective of the container size)
 - Consult waste pick-up schedule
- Prepare for transport to pick-up location
- Check on-line waste tag
 - Write date of pick-up on the waste tag

- Use secondary containment

Safety Data Sheet (SDS) Location

SDS can be found online: <http://ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lchemmsdsacc.htm>

Protocol/Procedure

Propylene oxide is used as monomer or co-monomer in polymerization reactions.

Propylene oxide containers are stored in the refrigerator and kept sealed at all times when not in use.

Propylene oxide is always handled wearing butyl gloves, safety goggles and a labcoat. Gloves are changed as soon as they are contaminated.

Due to its high volatility and toxicity, neat propylene oxide has to be handled within a fume hood at all times, including measuring and transferring to the reaction vessel.

Due to its flammability, propylene oxide is kept away from all sources of ignition.

Propylene oxide has to be disposed in the appropriate waste container, kept closed at all times.

NOTE: Any deviation from this SOP requires approval from PI.

Documentation of Training (signature of all users is required)

- Prior to conducting any work with propylene oxide, designated personnel, i.e. approved users listed below, must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the SDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training as required by EH&S.

I have read and understand the content of this SOP:

Name	Signature	Trainer	Date
Prof. Susannah Scott			
Stephanie Goubert-Renaudin			
Gary Kwanyi Ng			
Alessandro Gallo			

