

LAB SPECIFIC OPERATING PROCEDURE (LSOP) for Propylene Oxide

Principal Investigator (PI):

Building:

Lab(s) Covered by LSOP:

Department:

Lab Phone Number(s):

SECTION 1. PHYSICAL & CHEMICAL PROPERTIES

Synonyms : (±)-Methyloxirane 1,2-Epoxypropane

Formula : C3H6O Molecular weight : 58.08 g/mol CAS-No. : 75-56-9 EC-No. : 200-879-2 Index-No. : 603-055-00-4 Registration number : 01-2119480483-35-XXXX

Appearance Form: clear, liquid Colour: colourless b) Odour ether-like c) Odour Threshold No data available d) pH No data available e) Melting point/freezing point Melting point/range: -112 °C (-170 °F) - lit. f) Initial boiling point and boiling range 34 °C (93 °F) - lit. g) Flash point -37 °C (-35 °F) - closed cup h) Evaporation rate No data available i) Flammability (solid, gas) No data available j) Upper/lower flammability or explosive limits Upper explosion limit: 38.8 %(V) Lower explosion limit: 2.1 %(V) k) Vapour pressure 592.1 hPa (444.1 mmHg) at 20 °C (68 °F)

DOT (US) UN number: 1280 Class: 3 Packing group: I Proper shipping name: Propylene oxide Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No


SECTION 2. EXPOSURE CONTROL PARAMETERS

Methyloxirane 75-56-9 TWA 2.000000 ppm

USA. ACGIH Threshold Limit Values (TLV) Remarks Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Confirmed animal carcinogen with unknown relevance to humans Sensitizer Potential Occupational Carcinogen See Appendix A TWA 100.000000 ppm 240.000000 mg/m3 USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants The value in mg/m3 is approximate. TWA 2 ppm

USA. ACGIH Threshold Limit Values (TLV) Dermal Sensitization Upper Respiratory Tract irritation Eye irritation 2015 Adoption Confirmed animal carcinogen with unknown relevance to humans

SECTION 3. OSHA's (GHS)-SDS INFORMATION

Chemical Name	GHS Pictogram(s)	Generic Chemical Definition
Propylene Oxide		<p>Propylene oxide is an organic compound with the molecular formula CH₃CHCH₂O. This colourless volatile liquid with an odour resembling ether, is produced on a large scale industrially, its major application being its use for the production of polyether polyols for use in making polyurethane plastics. This compound is sometimes called 1,2-propylene oxide to distinguish it from its isomer 1,3-propylene oxide, better known as oxetane.</p> <p>Propylene oxide is commonly used in the preparation of biological samples for electron microscopy, to remove residual ethanol previously used for dehydration. In a typical procedure, the sample is first immersed in a mixture of equal volumes of ethanol and propylene oxide for 5 minutes, and then four times in pure oxide, 10 minutes each.</p>

OSHA's GHS Signal Word is **(DANGER)**

SECTION 4. GHS HAZARD (H) CODES and PRECAUTIONARY STATEMENT (P) CODES

(H)/Hazard Statement (s)

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS) Flammable liquids (Category 1), H224 Acute toxicity, Oral (Category 4), H302 Acute toxicity, Inhalation (Category 3), H331 Acute toxicity, Dermal (Category 4), H312 Skin irritation (Category 2), H315 Serious eye damage (Category 1), H318 Germ cell mutagenicity (Category 1B), H340 Carcinogenicity (Category 1B), H350 Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335 Acute aquatic toxicity (Category 3), H402

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Methyloxirane) NTP: Reasonably anticipated to be a human carcinogen (Methyloxirane)

H224 Extremely flammable liquid and vapor

H318 Causes serious eye damage.

H331 Toxic if inhaled.

(P)/Precautionary Statement (s)

P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment

P242 Use only non-sparking tools.

P240 Ground/bond container and receiving equipment

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P243 Take precautionary measures against static discharge.

SECTION 5. ADMINISTRATIVE CONTROLS

1. Lab-specific safety training must be provided by the principal investigator (PI) or other qualified personnel to all researchers working with **Propylene Oxide**.
2. The PI must perform a Workplace Hazard Assessment (WHA) form for Laboratories at, http://research.uhc.edu/wp-content/uploads/sites/1137/2015/09/workplace_hazard_assessment.pdf
3. Researchers must **not work alone** with **Propylene Oxide**. Please note that UCONN Health/Storrs has a **Working Alone Policy, found at <http://content.research.uconn.edu/pdf/uch/rcs/ehs/policy-workingalone2017.pdf>**
4. Documentation of training is required and satisfied upon review and sign-off of this LSOP and submission to EH&S for approval.
5. In addition to reviewing this document, you must review the Safety Data Sheet (SDS) for **Propylene Oxide** prior to use, and instruct your employees.
6. Whenever possible, find **safer substitutes or reduce** the quantities of **Propylene Oxide**.
7. Experiments should be performed **during normal business hours** (e.g.) 8:00 am-5:00 pm Mon-Fri) if possible.
8. Multiple transfers of small volumes/quantities of **Propylene Oxide** are preferred over a single transfer of larger volumes/quantities.
9. Any handling of **Propylene Oxide** requires supervision from the Lab supervisor, PI or other experience employee.

SECTION 6. ENGINEERING CONTROLS

10. Appropriate engineering controls-avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Wear the appropriate level of PPE per this document
11. Chemical fume hoods must be running at over 90 linear feet/minute and tested by EH&S within the last year.
12. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
13. Ensure that eyewash stations and safety showers are proximal to the workstation location and tested accordingly.
14. EH&S certifies flow rates of fume hoods for UCONN Health, contact EH&S at 860-679-2723 for re-test.

15.	If the hood is not working properly, contact Facilities to repair the hood at 860-679-2125.
16.	Work with Propylene Oxide – the work must only be conducted in a suitable/rated fume hood .
17.	Sash height must be kept as low as possible to avoid escaping fumes and provide a physical barrier.
SECTION 7. PERSONAL PROTECTIVE EQUIPMENT <i>(At a minimum, follow these PPE guidelines)</i>	
Eye and Face Protection	
In case of eye contact-rinse thoroughly with plenty of water using an eyewash station for at least 15 minutes, occasionally lifting the upper and lower eyelids. Remove contact lenses if possible.	
18.	Eye/face protection Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
19.	Ordinary prescription glasses will NOT provide adequate protection unless they also meet ANSI standard and have compliant side shields.
Skin and Body Protection	
In case of skin contact If skin contact occurs, and/or skin or clothing are on fire, immediately remove all clothing and drench in the safety shower with copious amounts of water for no less than 15 minutes to remove any remaining contaminants. If possible to do so without further injury, remove any remaining jewelry or clothing.	
20.	Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
21.	Splash contact Material: butyl-rubber Minimum layer thickness: 0.3 mm Break through time: 26 min Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)
22.	Body Protection-Complete suit protecting against chemicals, Flame retardant antistatic protective clothing . The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
23.	Long pants, closed-toe/closed-heel shoes, covered legs, and ankles.
SECTION 8. SPECIAL HANDLING & STORAGE REQUIREMENTS	
Conditions for safe handling	
24.	Precautions for safe handling of Propylene Oxide is to avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build-up of electrostatic charge.
25.	Conditions for safe storage, including any incompatibilities of Propylene Oxide is to keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
26.	Eliminate or substitute for a less hazardous material when possible.
27.	Design your experiment to use the least amount of material possible to achieve the desired result.
28.	Do not exceed the scale of procedures specified in Protocol/Procedure section without approval of the PI.
29.	Verify your experimental set-up and procedure prior to use.
30.	Know the location of the nearest eyewash, safety shower and fire extinguisher before beginning work.
31.	Upon leaving the work area, remove any personal protective equipment worn and wash hands.
32.	At the end of each project, thoroughly decontaminate the work area according to the material being handled.
Conditions for safe storage	
33.	Conditions for safe storage, including any incompatibilities Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
34.	Storage class (TRGS 510): Flammable liquids

SECTION 9. SPILLS, ACCIDENTS & EMERGENCY PROCEDURES	
35.	Call 911 or 7777 from landline if Life Threatening and call EH&S at 860-679-2723 for Non-Life Threatening Spill Coordination efforts.
36.	Evacuate the laboratory and inform others in the immediate area to leave the work area. Evacuate the laboratory calmly yet safely, and rally at the Emergency Assembly Area (EAA) as designated by the Fire Department
37.	The (EAA) is a pre-determined safe zone for employees to meet during an emergency.
38.	Upon evacuation, also try to minimize damage; isolate/contain if able. (e.g.) open hoods to accelerate dissipation in air, hit HVAC purge button to increase laboratory air changes, disconnect electrical sources etc.
39.	Upon Evacuation, close door(s) to lab and post a “NO ENTRY” sign(s) or other warning information on the door.
40.	The Emergency Evacuation Attendants (EEA) are those who have been assigned take roll call of employees and report to the Emergency Evacuation Coordinator (EEC)
41.	No one shall be permitted to leave the Emergency Assembly Area (EAA) until the scene has been determined safe for re-entry by the On-Scene Emergency Coordinator (EC) -Senior Fire Department Official.
42.	Do not re-enter the lab/area until instructed to do so by the On-Scene Emergency Coordinator (EC) -Senior Fire Department Official.
43.	Should the Emergency Assembly Area (EAA) be compromised, evacuees will be instructed by Emergency Evacuation Attendants (EEA's) or the Emergency Evacuation Coordinator (EEC) to re-locate to a secondary Emergency Assembly Area (SEAA)
44.	EH&S recommends that individual labs discuss emergency response and readiness at their laboratory meetings and practice drill. EH&S can aid in this effort along with Public Safety.
45.	Report Spills, accidents which are also deemed non-life threatening or non-emergency situations to your respective PI/Supervisor and EH&S.
SECTION 10. FIRST AID PROCEDURES <i>(Have your SDS Available for First Responders)</i>	
First Aid- Eyes	<ol style="list-style-type: none"> 1. Remove contact lenses (if applicable) 2. Forcibly hold eyelids open and flush eyes under eyewash for 15 minutes 3. If pain persists after 15 minutes, dial 911 4. Keep flushing eyes until emergency personnel arrives 5. Report incident to PI/Supervisor and EH&S.
First Aid- Skin	<ol style="list-style-type: none"> 1. Remove contaminated clothing (if applicable) 2. Flush affected area(s) under safety shower for 15 minutes 3. If pain persists after 15 minutes, dial 911 4. Keep rinsing affected area until emergency personnel arrives 5. Report incident to PI/Supervisor and EH&S. 6. Needle stick/puncture exposure-wash the affected area with antiseptic soap/warm water for 15 minutes.
First Aid- Inhalation	<ol style="list-style-type: none"> 1. Move to fresh air 2. Dial 911 3. Report incident to PI/Supervisor and EH&S.
SECTION 11. HAZARDOUS WASTE MANAGEMENT-(GENERAL)	
48.	All hazardous wastes must be labeled with “Hazardous Waste” stickers or tags, use full chemical names to describe the waste (i.e. no chemical abbreviations or symbols), have 100% of the constituents by volume identified and be stored in containers with tight-fitting caps or lids, and be segregated by chemical compatibility.
49.	Hazardous wastes must be stored at or near a green (S.A.A.) aka “Satellite Accumulation Area” sign prior to disposal by EH&S.
50.	Hazardous wastes must accumulate under the control of the generator, with a container maintained in good condition, free of exterior residues on container or in the spill tray. All spills and residues must be immediately cleaned up.
51.	Hazardous wastes must be transferred within a chemical fume hood but then be removed for temporary storage with the generator’s respective (SAA). When chemical waste is being transferred is the only time that it may remain open. Closed, means that no liquid will spill from a waste collection container, should the container be knocked over/inverted.
52.	All Propylene Oxide solutions and contaminated solids will be collected and characterized by EH&S as chemical hazardous waste
SECTION 12. SPECIFIC PROCEDURE <i>(left blank intentionally; please see & follow instructions)</i>	
<i>(Document the Experiment Information with regard to use of Propylene Oxide, too include the procedures for disposal of the waste and the selection and application of correct PPE)</i>	

