Standard Operating Procedure

**Dichloroethane**

Print a copy and insert into your
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.

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| **Department:** | Chemistry |
| **Date SOP was written:** | 3/10/2018 |
| **Date SOP was approved by PI/lab supervisor:** | 3/10/2018 |
| **Principal Investigator:** | Sarah Keller |
| **Location(s) covered by this SOP:** | *BAG 005* |
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**Type of SOP:** [ ]  Process [x] Hazardous Chemical [ ]  Hazardous Class

**Purpose**

1,2-dichloroethane (also called ethylene dichloride) is a select carcinogen. It is commonly used for production of vinyl chloride monomer and is often employed as a “building block” reagent to synthesize other compounds. The chemical also has properties allowing it to be used as a degreaser and a paint remover. A major concern when working with 1,2-dichloroethane is its high vapor pressure.

**Physical & Chemical Properties/Definition of Chemical Group**

**CAS#** 107-06-2

**Appearance** Form: clear liquid, colorless

**Safety data**

**Hazard class: Toxic, corrosive, highly flammable, carcinogen**

pH: no data available

Melting point/freezing point: -35 °C (-31 °F)

Boiling point: 83 °C (181 °F)

Flash point: 13.0 °C (55.4 °F)

Ignition temperature: 413 °C (775 °F) at 1,013 hPa (760 mmHg)

Autoignition temperature: 413.0 °C (775.4 °F)

Lower explosion limit: 6.2 %(V)

Upper explosion limit: 16.2 %(V)

Vapor pressure: 33.3 hPa (25.0 mmHg) at 0 °C (32 °F)

 86 hPa (65 mmHg) at 20 °C (68 °F

 312 hPa (234 mmHg) at 50 °C (122 °F)

Density: 1.256 g/mL at 25 °C (77 °F)

Water solubility: 8.69 g/l at 20 °C (68 °F), 10.3 g/l at 56 °C (133 °F)

Partition coefficient: n-octanol/water, log Pow: 1.48 at 20 °C (68 °F)

**Potential Hazards/Toxicity**

**OSHA Hazards:** Flammable liquid, Carcinogen, Harmful by ingestion, Corrosive

**Target Organs:** Heart, central nervous system, liver, kidney, pancreas.

**Routes of exposure**

**Ingestion:** Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 grams may be fatal or may produce serious damage to the health of the individual. Ingestion of 1,2-dichloroethane may cause nausea, vomiting, dizziness, incoherence, cyanosis, and in extreme cases, extensive hemorrhage colitis and multiple perivascular hemorrhages of the brain leading to death. Cases of fatal poisoning due to ingestion have been cited in the literature.

**Eye exposure:** May produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain. 1,2-dichloroethane is capable of causing conjunctival and corneal clouding from repeated exposures.

**Skin contact:** The material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering. Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Entry into the blood-stream, though, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

**Inhalation:** The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Vapors may cause drowsiness and dizziness and may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo. Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages: signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved. Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction.

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| Chronic health effects: Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. |

**Personal Protective Equipment (PPE)**

**Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Do not use a respirator instead of engineering controls unless such engineering controls are unavailable.

**Hand protection**

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. Chloroflex, Best Viton, and Best Viton II gloves all have breakthrough times over 2 hours.

**Eye protection**

Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin and body protection**

Flame resistant lab coat preferably made of antistatic material, The type of protective equipment must be selected according to the concentration and amount of the chemical used. Given the flammability of the chemical please avoid lab coats or protective equipment made from synthetic fibers such as polyester.

**Hygiene measures**

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

**Engineering Controls**

Multiple types of controls to prevent employee overexposure exist.

* Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area such as a fume hood.
* Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.
* Open-vessel systems are prohibited.
* Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.
* Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.
* Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).
* Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.

**First Aid Procedures**

**If inhaled:** If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact:** Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

**In case of eye contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed:** Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**Special Handling and Storage Requirements**

**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build-up of electrostatic charge.

**Conditions for safe storage**

Store in cool place. 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. Store away from heat sources and in a flame proof area.

**Spill and Accident Procedure**

**Spill** – Help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors. Eliminate sources of ignition if the chemical is flammable. 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 **911** and UW EH&S at 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 for 15 minutes by forcibly holding the eye open. Seek medical attention. *Notify supervisor and EH&S immediately.*

# **Medical Emergency**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911**

**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.

**Decontamination/Waste Disposal Procedure**

Hazardous waste disposal guidelines: Call UW EH&S regarding disposal procedure for empty containers.

**Material Safety Data Sheet (MSDS) Location**

Online MSDS can be accessed at <http://msds.ehs.ucla.edu>.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Principal Investigator SOP Approval**

Print name Sarah Keller

Signature\_\_

Approval Date: 3/10/2018