

Tufts University Standard Operating Procedure (SOP) for: Acrolein

CAS # 107-02-8

Synonyms: Acrolein, 2-Propenal, Propenal

NFPA 4, HMIS 4

Toxicity

Acrolein is the simplest unsaturated aldehyde. Acrolein is a colorless or yellow liquid with a intensely irritating odor and acrid smell. Acrolein is a hazardous liquid that is very toxic and corrosive. It is a highly flammable liquid or vapor and may have the potential to form peroxides with varying conditions of use but are normally stable. It easily dissolves in water. It may be fatal if ingested, inhaled, or absorbed through the skin. It may cause respiratory tract, skin, and eye irritation. Vapors are corrosive and will burn your eyes. It can cause severe burns to skin and eyes with permanent damage.

It is used as a chemical intermediate in the production of acrylic acid and its esters. It is also used as a fixative in electron microscopy imaging of biological specimens.

Physical Hazards

Acrolein is a highly flammable liquid that quickly changes to a vapor when heated and burns easily. It can polymerize violently upon exposure to temperatures $>50^{\circ}\text{C}$, light or chemical initiators such as amines, base and acids. It also forms explosive levels of peroxides without concentration by evaporation or distillation.

Health Hazards

Acrolein is highly toxic via inhalation and skin absorption. Inhalation of low levels of acrolein causes moderate to severe irritation of the eyes, nose and respiratory system. Inhalation of higher concentrations can cause immediate or delayed pulmonary edema and other lung injuries. Eye or skin contact can cause burns. Absorption through the skin can also cause delayed pulmonary edema and other systemic effects.

Good Practices and Personal Protective Equipment (PPE)

- Wear gloves (butyl rubber gloves are recommended, or double glove with nitrile) standard laboratory clothing; a fully-buttoned lab coat, long pants, closed-toe shoes, and safety glasses.
- Inspect all PPE prior to and after use
- If there is a risk of splash, wear a full face shield.
- Ensure that the entire hand and arm area is covered.
- All manipulations that can generate vapors, fumes or sprays must be done in a chemical fume hood.
- Due to the high hazard nature of Acrolein, only purchase minimal quantities of material needed for ongoing work.
- Dispose of contaminated gloves and all residual and disposable materials (i.e., stock bottles, pipette tips, kimwipes, etc) in a sealed container.

Incompatibilities

- Avoid purchasing this compound without an added inhibitor (typically hydroquinone as stabilizer) as it will polymerize readily.

- May form shock-sensitive peroxides over time,
- The receive and open dates must be written upon the label.
- Once the container is opened DO NOT store for more than six (6) months. Unopened containers cannot be stored longer than 12 months.
- Segregate from amines, sulfur dioxide, metal salts, oxidants, thiourea, dimethylamine, oxidizers, acids and bases.
- Store in tightly closed containers in a cool, well-ventilated area away from heat, air, light and moisture.
- Use in areas free of ignition sources and avoid creating static electricity.

Spills

If you spill a small amount (minor spill) of Acrolein inside a fume hood, notify your supervisor for cleanup assistance. A major spill is any amount of chemical that the lab staff cannot easily and safely clean up without outside assistance. In this case, vacate the lab and call your supervisor and TUPD at 6-6911.

Small liquid spill inside a fume hood:

If spilled in a fume hood and it is safe to clean up the spill, alert people in the immediate area. Wear PPE listed above and utility grade butyl gloves. Confine spill to a small area with dry paper towels or absorbent material (pads, vermiculite). Collect residue, contaminated pads, paper towels, vermiculite and contaminated gloves and place in container, label container and dispose of as hazardous waste.

Larger spill or spill outside a fume hood:

Evacuate the spill area. If acrolein spills are present in the room and there is a risk of fire pull the fire alarm. Try to turn off all sources of flame and ignition as you evacuate. Post someone or mark the hazardous area with tape and warning signs to keep others from entering. During business hours, if there was no exposure and there is no risk of fire, call EHS at 6-3615 for further assistance. After business hours call 6-6911. Stay nearby until emergency personnel arrive and provide them with information on the chemicals involved.

Accident/Exposures

If inhaled

Remove to fresh air. Call 911 for immediate medical attention.

In case of skin contact

Go to the nearest emergency shower if contaminated. Yell for assistance and rinse for 15 minutes, removing all articles of clothing to ensure contaminate is completely removed. Call 911 for immediate medical attention.

In case of eye contact

Go to the nearest emergency eyewash. Yell for assistance and rinse for 15 minutes. Call 911 for immediate medical attention.

Disposal:

Acroliein is an acutely toxic (P-Listed waste) thus all solutions/stock materials must be collected as hazardous waste and should never be disposed of down the drain or as laboratory trash. Additionally, all residual and disposable materials (i.e., stock bottles, pipette tips, kimwipes, etc) rinse water and empty containers of this material must be collected and disposed as hazardous waste

- A chemical pick-up request must be made when the hazardous waste needs to be removed.

- Opened container(s): must be picked up for disposal within six (6) months of receiving the chemical.
- Unopened container(s): must be picked up for disposal within 12 months of receiving the chemical.

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References:

-SDS for Acrolein, Sigma Aldrich 03/03/2015

<http://www.sigmaaldrich.com/catalog/product/aldrich/110221?lang=en®ion=US>

-Cameo Chemicals, NOAA:

<http://www.cameochemicals.noaa.gov/chemical/2300>

-University of Washington, Environmental Health and Safety. Standard Operating Procedure for Acrolein:

<http://www.ehs.washington.edu/psolabsaf/2011/Acrolein%20SOP.pdf>

-Yale Environmental Health and Safety. Standard Operating Procedure: Acrolein.

http://ehs.yale.edu/sites/default/files/Chemical_SOP_Acrolein.pdf

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