



# Standard Operating Procedure

## ACROLEIN

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Acrolein is a colorless or yellow liquid with a intensely irritating odor that easily dissolves in water. 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.

### Potential Hazards/Toxicity

#### 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.

Users must familiarize themselves with the specific hazards of the compounds they are working with, which can be found on the chemical's Safety Data Sheet (SDS). SDSs are available through the ChemWatch link on Yale's EHS webpage ([ehs.yale.edu](http://ehs.yale.edu)).

### Personal Protective Equipment (PPE)

The University's Personal Protective Equipment Policy can be found here: <http://ehs.yale.edu/PPEPolicy>

#### Eye Protection

Safety glasses must be worn. When there is the potential for splashes, goggles and a faceshield must be worn.

#### Hand Protection

Utility grade butyl gloves must be worn over exam-style nitrile gloves whenever handling acrolein.

#### Skin and Body Protection

Long pants or clothing that covers the body to the ankles and closed-toe solid top shoes must be worn when handling acrolein. Lab coats must be worn. If working with larger amounts where a splash to the body/arms is possible, then additional body protection should be worn, i.e., chemical resistant apron, oversleeves, etc.

### Engineering Controls

Acrolein must always be handled inside a fume hood or in a glove box.

## Storage/Handling

- Avoid purchasing this compound without an added inhibitor as it will polymerize readily.
- May form shock-sensitive peroxides over time, so do not store opened containers for more than 3 months.
- Segregate from amines, 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.

## Emergency Procedures

### Fire Extinguishers

Both ABC dry powder and carbon dioxide extinguishers are appropriate for most fires involving acrolein.

### Eyewash/Safety Showers

An ANSI approved eyewash station that can provide quick drenching or flushing of the eyes must be immediately available within 10 seconds travel time for emergency use. An ANSI approved safety drench shower must also be available within 10 seconds travel time from where acrolein is used. Ensure the locations of the eyewashes and safety showers, and how to activate them, are known prior to an emergency.

## First Aid Procedures

### 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.

## Spills

### Small Spill (inside a fume hood)

If a small spill occurs inside a fume hood, lab personnel should be able to safely clean it up by following these spill clean up procedures:

- Alert people in immediate area of spill
- Wear personal protective equipment, including utility grade butyl gloves
- Confine spill to small area with absorbent material (pads, vermiculite)
- Collect residue, place in container, label container, and dispose of as hazardous waste

### **Larger Spill or Spill Outside a Fume Hood**

- Call EHS for emergency assistance (203-785-3555)
- Evacuate the spill area
- Post someone or mark-off the hazardous area with tape and warning signs to keep other people from entering
- Stay nearby until emergency personnel arrive and provide them with information on the chemicals involved

### **Waste Disposal**

Acrolein solutions/stock materials must be collected as hazardous waste and should never be disposed of down the drain. Acrolein is an acutely toxic (P-Listed) compound and all items contaminated with acutely toxic compounds must be collected as hazardous waste (i.e., stock bottles, pipette tips, kimwipes, etc.).

### **Lab Specific Protocol/Procedure:**

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Principal Investigator's Signature/Date