Ethyl Alcohol

H225 H319

Areas with blue text indicate that information must be provided or modified by researcher prior to the SOP approval.

This SOP is not a substitute for hands-on training.

Print a copy and insert into your laboratory SOP binder.

Department:	
Date SOP was written:	
Date SOP was approved by PI/lab supervisor:	
Principal investigator/lab supervisor:	Name: **Signature:** _____
Internal lab safety coordinator or lab manager:	Name: Lab Phone: Office Phone:
Emergency Contact:	Name: Phone Number:
Location(s) covered by this SOP:	

1. Purpose

Ethyl alcohol (or ethanol) is a common lab disinfectant used in glassware clean up. Ethanol is a highly flammable chemical. It can be denatured with toluene or other compounds. When ethanol is denatured with toluene, it is considered a particularly hazardous substance. Users must be aware of the hazards of the denaturing compound when denatured ethanol is used.

If you have questions concerning the applicability of any recommendation or requirement listed in this procedure, contact the principal investigator/laboratory supervisor or the campus chemical hygiene officer at ucbcho@berkeley.edu.

2. Physical & Chemical Properties

Ethanol
CAS#: **64-17-5**
Molecular Formula: C_2H_6O
Form (physical state): Liquid
Color: Colorless; Clear
Melting/point/freezing point: -114°C (-173°F)
Boiling point: 78°C (172°F)
Vapor Pressure: 5.7 kPa (@20°C)

Density:
Flash point: 14.0°C (57.2°F) - closed cup
Lower flammable limit: 3.3%
Upper flammable limit: 19%
Odor: Mild to strong, like wine or whiskey
Odor Threshold: 100 ppm

3. Potential Hazards/Toxicity

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) designates ethanol by the following pictograms, H codes, and precautionary statements:

GHS pictograms and H codes, including precautionary statements

Pictogram

Signal Word: Danger

Hazard Statement(s)

H225	Highly flammable liquid and vapour
H319	Causes serious eye irritation

4. Engineering Controls

Use the engineering controls listed below unless other lab-specific information is included in Section 12 – Protocol/Procedure.

- Work with ethanol should be conducted in a fume hood unless other controls are designated in the lab-specific Protocol/Procedure section (e.g., flame sterilization procedure is performed outside the fume hood). Sash height should be kept as low as possible to avoid escaping fumes.
- Eliminate any ignition source that is not part of the experimental procedure.

5. Personal Protective Equipment

At a minimum, the following personal protective equipment (PPE) must be worn at all times.

Eye Protection

A. ANSI Z87.1-compliant safety glasses with side shields or chemical splash goggles.

✓ Ordinary prescription glasses will NOT provide adequate protection unless they also meet ANSI standard and have compliant side shields.

Skin and Body Protection

A. For splash protection, use Nitrile gloves, and for immersion, use Butyl Rubber gloves.
B. Long pants, closed-toe/closed-heel shoes, and covered legs and ankles. Non-synthetic clothing should be worn.
C. Lab coat must be worn:
   - ✓ Working with < 1L of ethanol and no ignition source present – Polyester-cotton combination
   - ✓ Working with > 1L of ethanol and no ignition source present – Flame-resistant lab coat (Nomex IIIA, NFPA 2112)
   - ✓ Working any volume of ethanol and ignition source present – Flame-resistant lab coat (Nomex IIIA, NFPA 2112)

6. First Aid Procedures and Medical Emergencies

In the event of an injury, notify your supervisor immediately. If the lab has a BUA, notify EH&S immediately for an injury or within 8 hours for a spill.

⚠ ***Go to the Occupational Health Facility (Tang Health Center, on campus); if after hours, go to the nearest emergency room (Alta Bates, 2450 Ashby Ave in Berkeley); or***

⚠ ***Call 510-642-3333 (from a cell phone) or 911 (from land line) if:***

- ***it is a life threatening emergency; or***
- ***you are not confident in your ability to fully assess the conditions of the environment and/or the condition of the contaminated/injured person, or you cannot be assured of your own safety; or***
- ***the contaminated/injured person is not breathing or is unconscious.***

Please remember to provide a copy of the appropriate manufacturer SDS (if available) to the emergency responders or physician. At a minimum, be ready to provide the identity/name of any hazardous materials involved.

In Case of Skin Contact

If your skin or clothing catches fire, do not run: stop, drop, and roll on the ground to smother the flames. Alternatively, if skin or clothing is on fire, immediately drench in the safety shower with copious amounts of water for no less than 15 minutes.

For flame burns, flush the burn area with low-pressure running water. Never put ice on a burn. Do not rub a burned area; rubbing can cause further tissue damage. If your finger is burned, do not put it in your mouth.

Always seek medical attention for burns. You should obtain medical assistance as soon as possible.

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.

If Swallowed

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

7. Special Handling, Storage, and Disposal Requirements

Lab-specific information on handling and storage may be included in the Protocol/Procedure section.

Working Alone - Ask the principal investigator for specific prohibitions (if any) on working alone.

Precautions for Safe Handling

- Use appropriate ventilation.
- Take precautions to prevent static electricity buildup when transferring contents.
- Remove any source of spark or ignition sources that are not relevant to your experiment.

Conditions for Safe Storage

- Stored in approved flammable solvent cabinet, away from heat, sparks, and flames.
- Keep quantities to a minimum.
- Keep container tightly closed and in a cool and well-ventilated location.
- Provide secondary containment for chemicals

Disposal

- Waste materials generated should be treated as a hazardous waste.
- Label all waste containers with the label provided at http://ehs.berkeley.edu/hm/279-new-hazardous-waste-program-hwp.html
- The empty container should be left open in the back of the hood for about a week.

8. Chemical Spill

Spill – Assess the extent of danger; if necessary, request help by calling **911** (from a cell phone: **510-642-3333**) for emergency assistance or 510-642-3073 for non-life threatening situations. If you cannot assess the conditions of the environment well enough to be sure of your own safety, do not enter the area. If possible, help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors from spill. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area.

- **Minor Spill –** In the event of a minor spill, if there is no potential for hazardous chemical exposure, report the spill to 510-642-3073 and proceed to clean it, if you are trained. Use appropriate personal protective equipment and cleanup material for chemical spilled. Double bag spill waste in clear plastic bags, label, and take to the next chemical waste pickup.
- **Major Spill –** Any hazardous chemical spill that involves chemical exposure, any chemical spill that due to size and/or hazard requires capabilities beyond your training, or any chemical spill that gives the perception (e.g., because of odor) that there has been a hazardous release. Call **911** or 510-642-3073 for assistance.

9. Cleaning and Decontamination

Lab-specific information on decontamination may be included in Section 12 – Protocol/Procedure.

- Wearing proper PPE, laboratory work surfaces must be cleaned at the conclusion of each procedure and at the end of each work day.

10. Hazardous Waste Disposal

Label Waste

- Label all waste containers with a label provided at

  https://jwas.ehs.berkeley.edu/hwp

- See the EH&S Fact Sheet, "Hazardous Waste Management" for general instructions on procedures for disposing of hazardous waste.

Dispose of Waste

- Dispose of regularly generated chemical waste within 6 months.
- Contact EH&S at 510-642-3073 if you need assistance.

11. Safety Data Sheet (SDS) Location

SDS can be accessed online at http://www.ucsds.com

-Take Ownership of Your Safety-

Before starting any work, ask yourself:

1- What will I be doing?
2- Do I know what the hazards are?
3- Do I have everything I need to do the job safely?
4- Am I doing the job safely?
5- What can we do better?

12. Protocol/Procedure – Ethyl Alcohol

Section 12 must be customized to your specific needs. Delete any procedure that does not apply to your laboratory.

Procedure/Use	Scale	Engineering Controls/Equipment	PPE (Eye, Face, Gloves, Clothing)	Procedure Steps and Precautions
1. Ethanol is used to sterilize petri plate spreaders. Ethanol is used to clean some glassware.	< 100 mL of ethanol as supplied in the reagent bottle. No more than 500 mL when using to clean glassware. Remember to obtain PI approval if higher scale is necessary.	Use in properly operating fume hood.	Eye Protection: Wear ANSI approved safety glasses with side shields or tightly fitting safety goggles. Face Protection: Use face shield if hood sash doesn ' t provide protection. Hand Protection: Due to the potential for more significant contact use butyl-rubber (minimum layer thickness: 0.3 mm), Aldrich reference. Clothing: Full length pants or equivalent; and closed-toe and closed-heel shoes. Lab coat: - Working with any volume of ethanol and no ignition source present – Polyester-cotton combination - Working with any volume of ethanol and ignition source present – Flame-resistant lab coat (Nomex IIIA, NFPA 2112)	Avoid inhalation and skin contact Take precautions to prevent static electricity buildup when transferring contents. Replace gloves after prolong contact. When used to clean glassware, leave the cleaned glassware in the fume hood until the solvent has evaporated off. Dispose of the contaminated ethanol as a hazardous waste.
Notes	**Any deviation from this SOP requires approval from PI.**			

Procedure/ Use	Scale	Engineering Controls/ Equipment	PPE (Eye, Face, Gloves, Clothing)	Procedure Steps and Special Precautions for this Procedure
2. Using ethanol as solvents in reactions, or extractions.	Up to 100 mL as supplied in the reagent bottle when used as a reaction solvent. No more than 500 mL when using for extractions. Remember to obtain PI approval if higher scale is necessary.	All operations using these materials must be performed in a properly operating fume hood. Blast shields must be used if the reaction has the potential to generate large quantities of gases or is strongly exothermic. Open flames and possible sparking and static electricity must be avoided.	Eye Protection: Wear ANSI approved tight-fitting safety goggles or safety glasses with side shields. Face Protection: Use face shield if hood sash doesn ' t provide protection. Hand Protection: 1) Incidental, light use or splash use Nitrile gloves (minimum layer thickness: 0.2 mm) and 2) immersion use butyl-rubber (minimum layer thickness: 0.3 mm), Aldrich reference. Clothing: Full length pants or equivalent; and closed-toe and closed-heel shoes. Lab coat: - Working with any volume of ethanol and no ignition source present – Polyester-cotton combination. - Working with any volume of ethanol and ignition source present – Flame-resistant lab coat (Nomex IIIA, NFPA 2112).	Avoid inhalation of these materials. Take precautions to prevent static electricity buildup when transferring contents. If a rotary evaporator is used ensure it is vented in the fume hood. If it is necessary to condense the solvent, use an open cold trap system. Pressure can be built up when ethanol is used in closed reaction vessel. Pressure may be built up if when performing extractions. Adequate ventilation (open the valve frequently during the extraction) has to be used to prevent dangerous over pressurization. The vapor in such a process must be released in a fume hood. If heated, the reaction apparatus has to be fitted with an adequately sized condenser and an adequate flow of cooling water has to be provided to prevent evaporation. Cooling hoses have to be secured with hose clamps to the condenser and the outlet.
Notes	**Any deviation from this SOP requires approval from PI.**			