Standard operating procedures (SOP) are intended to provide you with general guidance on how to safely work with a specific class of chemical or hazard. This SOP is generic in nature. It addresses the use and handling of substances by hazard class only. In some instances multiple SOPs may be applicable for a specific chemical (i.e., both the SOPs for flammable liquids and carcinogens would apply to benzene). If you have questions concerning the applicability of any item listed in this procedure contact Environmental Health & Safety (619) 594-6778 or the Principal Investigator of your laboratory. Specific written procedures are the responsibility of the principal investigator.

If compliance with all the requirements of this standard operating procedure is not possible, the principal investigator must develop a written procedure that will be used in its place. This alternate procedure must provide the same level of protection as the SOP it replaces.

Flammable liquids are chemicals that have a flash point below 140°F and a vapor pressure that does not exceed 40 psig at 100°F.

Hazard assessment

Hazard assessment for work involving flammable liquids should thoroughly address the issues of proper use and handling, fire safety, chemical toxicity, storage, and spill response.

EHRS Notification

Not applicable

Special storage

The storage of flammable and combustible liquids in a laboratory, shop or building area must be kept to the minimum needed for research and/or operations. If more than 5 gallons of flammables are present outside of safety cans per 100 square feet of area, a flammable-liquids storage cabinet is required. Flammable-liquids storage cabinets are not intended for the storage of highly toxic materials, acids, bases, compressed gases or pyrolytic chemicals.

Where feasible (if the quality of the solvent will not be adversely affected) transfer flammable liquids from glass bottles into metal safety cans.

Designated area

Not applicable

Securing of gas cylinders

Not applicable

Eye protection

Eye protection in the form of safety glasses must be worn at all times when handling flammable liquids. Ordinary (street) prescription glasses do not provide adequate protection. (Contrary to popular opinion these glasses cannot pass the rigorous test for industrial safety glasses.) Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87.1 1989) and must be equipped with side shields. Safety glasses with
side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn.

**Eyewash**

Where the eyes or body of any person may be exposed to flammable liquids suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Bottle type eyewash stations are not acceptable.

**Respiratory Protection**

**Fume hood**

When possible experiments involving greater than 500 ml of flammable liquids should be carried out in a fume hood.

**Glove (dry) box**

Not applicable

**Special ventilation**

Manipulation of flammable liquids outside of a fume hood may require special ventilation controls in order to minimize exposure to the material. Fume hoods provide the best protection against exposure to flammable liquids in the laboratory and are the preferred ventilation control device. Always attempt to handle large quantities of flammable liquids in a fume hood. If your research does not permit the handing of large quantities of flammable liquids in your fume hood, contact Environmental Health & Safety (619) 594-6778 to review the adequacy of all special ventilation.

**Protective apparel**

Lab coats, closed toed shoes and long sleeved clothing should be worn when handling flammable liquids. Additional protective clothing should be worn if the possibility of skin contact is likely.

**Safety shielding**

Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of flammable liquids which pose this risk should occur in a fume hood with the sash in the lowest feasible position. Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. Portable shields, which provide protection to all laboratory occupants, are acceptable.

**Gloves**

Gloves should be worn when handling flammable liquids. Disposable nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. Lab workers should contact EH&S for advice on chemical resistant glove selection when direct or prolonged contact with hazardous chemicals is anticipated.

**Safety shower**

A safety or drench shower should be available in a nearby location where the flammable liquids are used.

**Signs and labels**
**Containers:** All flammable liquids must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.

**Spill response**

Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any flammable liquids. Spill supplies for flammable liquids are designed to control the liquid portion of the spill and minimize the production of flammable vapors. Never use paper towels on large spills of flammable liquids because it exacerbates vapor production.

In the event of a spill all personnel in the area should be alerted. Turn off all sources of ignition. Do not attempt to handle a large spill of flammable liquids. Vacate the laboratory immediately and call for assistance.

- Environmental Health & Safety (619) 594-6778
- San Diego State University Public Safety Emergency Number (619) 594-1991 or 911 from a campus phone.

Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

**Vacuum protection**

Evacuated glassware can implode and eject flying glass, and splattered chemicals. Vacuum work involving flammable liquids must be conducted in a fume hood, glove box or isolated in an acceptable manner.

Mechanical vacuum pumps must be protected using cold traps and, where appropriate, filtered to prevent particulate release. The exhaust for the pumps must be vented into an exhaust hood. Vacuum pumps should be rated for use with flammable liquids.

**Waste disposal**

Some flammable liquids are hazardous wastes. Questions regarding waste disposal should be directed to Environmental Health & Safety (619) 594-6778.

**Decontamination procedures**

**Personnel:** Wash hands and arms with soap and water immediately following any skin contact with flammable liquids.

**Emergency procedure**

Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptom of overexposure must be developed. The procedures should address as a minimum the following:

**Who to contact:** (University police, Environmental Health & Safety (619) 594-6778, and Principal investigator of the laboratory including evening phone number)

The location of all safety equipment (showers, eye wash, fire extinguishers, etc.)

The method used to alert personnel in nearby areas of potential hazards

Special spill control materials required by the type of flammable liquids handled in the laboratory