

Electrical Safety Guidelines

The danger of injury through electric shock is possible whenever electrical power is present. When a person's body completes a circuit and thus connects a power source with the ground, an electrical burn or injury is imminent. Most fatal injuries result from high voltage exposure; however, people can sustain severe injuries from low voltage power if it has a high current flow (see attachment). In addition, overloaded circuits and poorly maintained electrical equipment and connections can lead to fires. Electrical fires are obviously capable of causing injuries and usually result in significant damage to facilities.

General Electrical Safety

Electrical safety is important in every laboratory, shop, classroom and office in the College of Chemistry. Follow these guidelines for general electrical safety:

- Be familiar with the electrical hazards in your office, laboratory or shop
- Be familiar with electrical emergency response procedures
- Unplug electrical equipment before repairing or servicing it
- DO NOT work on electrical equipment unless you are qualified to do so. This includes changing electrical plugs on equipment.
- Inspect cords and plugs for defects such as frayed wiring, loose connections or cracked insulation. Repair or replace items which exhibit these defects.
- Ensure that all outlets are firmly mounted and in good condition.
- Report all electrical problems (tripped breakers, broken switches and flickering lights) to College Physical Plant (2-5231)
- Keep electrical equipment and appliances away from water
- Avoid overloading circuits--if possible only plug a single appliance into an outlet
- If multiple appliances are necessary, use an approved UL listed power strip that has a surge protector and a circuit breaker
- Ensure that all electrical equipment have grounded plugs (3-prong for 110/208V single phase and 4-prong for any 3-phase system)
- Keep electric cords away from areas where they may be pinched and areas where they may pose a tripping or fire hazard (i.e. door ways, walkways, under carpet, etc.)

Extension Cords

Extension cords should only be used on a temporary basis and are not to be used in place of permanent wiring. If work requires using equipment or appliances in areas where there are not enough outlets, request that the College Shops install additional outlets as needed.

Ensure that all extension cords are the correct size and rating for the equipment in use. The diameter of the extension cord should be the same or greater than the cord of the equipment. If you are unsure about the rating of an extension cord, contact the College Electrical Shop for advice.

Electrical Panels

Electrical panels or breaker boxes require special safety considerations, including the following:

- Know the location of the electrical panel in your work area

Do not block access to the panel with furniture or equipment. You must maintain a 36” clearance in front of the panel to provide unobstructed access.
Never tape circuit switches to keep a breaker from tripping
Ensure that breakers are accurately labeled within panel boxes
Ensure that the panel door is securely attached.
Report tripped breakers to College Physical Plant (2-5231)

Electrical Emergency Response

All employees should be familiar with the following guidelines for handling two types of electrical emergencies:

1. Electric Shock

When someone suffers from a serious electrical shock, he or she may be knocked unconscious. If the victim is still in contact with the electric current, immediately turn off the power source. If you cannot disconnect the power source, try to separate or pry the victim away from the power source by using a non-conductive item such as a piece of dry wood or book. **Never touch a victim that is still in contact with the power source; you could electrocute yourself.**

After removing the person from the power source, call 9-911 to summon medical help and administer first aid or CPR if you are trained to do so. Also call 2-9090 to summon the College emergency response team.

2. Electrical Fire

Specific response procedures for fires are presented in the pink safety section of the “Who Does it! Where to Find it! How to do it Safely!” booklet. College workers must review this material to be aware of the procedures to follow in the event of a fire in their work place.

In the case of an electrical fire, try to disconnect the electrical power source if possible. If the fire is small, you are not in any immediate danger, and you have been trained in using fire extinguishers, use a type ABC fire extinguisher to extinguish the fire. Never use a water fire extinguisher on electrical fires. Once the fire is extinguished, immediately notify the College emergency action director by calling 2-9090.

Lockout/Tagout Procedures

Lockout/Tagout procedures are used to protect workers from exposure to hazardous electrical or mechanical energy sources while working on electrical systems or mechanical devices. Lockout/Tagout procedures must be implemented if:

A person may contact electrified or otherwise energized components while performing the work

A person is required to remove or bypass any guard, interlock, or other safety device (including equipment covers) to perform the work.

A person is required to place any part of his or her body into an area on the machinery or piece of equipment where work is performed during the equipment’s operation.

A complete description of the UC Berkeley Lockout/Tagout program is found in the Campus Help Sheet: Lockout/Tagout: Procedures for Controlling Hazardous Energies

(located in section 7 of the College of Chemistry Health and Safety Manual). College supervisors are responsible for reviewing this material and implementing lockout/tagout procedures as required under the program.

High Voltage Equipment

In addition to the guidelines associated with general electrical safety and lockout/tagout procedures, there are more stringent safety requirements for working on high voltage systems. The following list provides high voltage safety tips. For more information, please refer to Title 29 Section 1910.269 of the Code of Federal Regulations or NFPA 70 (National Electric Code).

- Ensure that only authorized employees work around high voltage equipment
- Label entrances and equipment with Danger--High Voltage signs
- Ensure that terminal voltage ratings can withstand surges caused by electrical faults or switching transients.
- Be careful around output circuits even when the input power is off. Parallel power sources and energy storage devices can still be dangerous.
- Be careful when working with power supplies that serve more than one area.
- Before working in a high voltage area, inspect the power supply and check all protective devices.
- Do not work alone near high voltage.
- Label equipment to identify power sources. Label input power sources to identify connected power supply loads.
- Attach emergency shutdown instructions and phone numbers to equipment that is remotely controlled or unattended while energized.
- Before entering a power supply or associated equipment enclosure to work on hazardous energy sources, complete the following:
 - De-energize the equipment.
 - Open and lockout the main input power circuit breaker.
 - Check for auxiliary power circuits that could still be energized.
 - Inspect automatic shorting devices for proper operation.
 - Short the power supply with grounding hoods.