Electrical Safety

Berkeley UNIVERSITY OF CALIFORNIA EH&S OFFICE OF ENVIRONMENT, HEALTH AND SAFETY

Lab Equipment Hazards & Controls

Overview: These questions can be used to identify hazards at each step, and outlines proper hazard controls for laboratory equipment that have **High Voltage > 50 V**, as well as new capital equipment.

Instructions: Review *Type of Hazard* questions, follow *Type of Control* recommendations.

Type of Hazard	Type of Control
Lab Equipment Installation Do you know the electrical requirements of the lab equipment as well as the available electrical infrastructure required to support it?	Where researchers or other laboratory staff have questions, consultation with campus electricians (Facilities Services Work Order Desk, 642-1032) is recommended.
Lab Equipment Procurement Is new equipment UL listed or NRTL approved? These acronyms indicate that a consumer product has been tested by this third-party laboratory and that it is certified to meet nationally recognized standards for that type of product.	Custom-built equipment shall be tested by a third party, like UL. Make sure electrical infrastructure and additional controls are discussed when procuring equipment that is not North American standard compliant.
Electrical Safety and Power system Is electrical equipment near a source of water?	Any receptacle within six feet (6'-0") of a source of water must be protected by a Ground Fault Circuit Interrupter (GFCI). **Labs:** Design according to the UC Lab Design Manual

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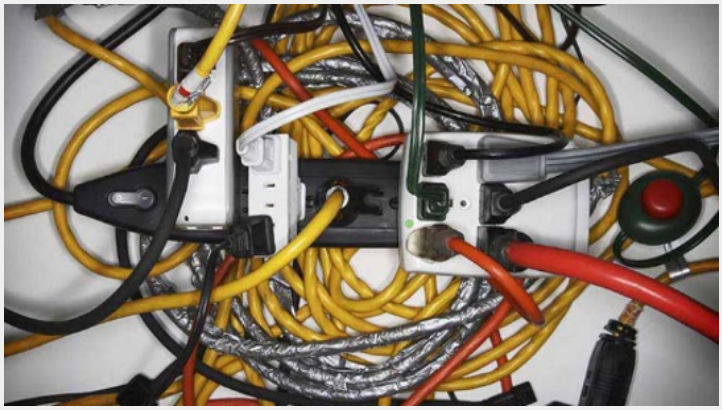
Power strips - *No daisy-chaining*
Have you checked lab power strips lately?

Don’t let your extension cords become potential fire hazards.



Select cords that are rated to handle the wattage of the devices with which they'll be used.

- Don't plug multiple cords together.
- Unplug extension cords when they're not in use.
- Throw away damaged cords.
- Pull the plug — not the cord — when disconnecting from the outlet.
- When an extension cord is used, take extra precautions to prevent electric shock
- If the extension cord is covered, heat is unable to escape and could result in a fire.
- Make sure extension cords are visible and if at all possible, not running across highly trafficked areas. They can be a trip hazard for people walking through the area.

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Electrical Cords Are flexible cords and cables maintained to preserve insulation integrity?	Integrity and safe placement of electrical cords are important in lab environments.   1. **Damaged Cords and Cables.** Cords and cables shall not have worn, frayed, or damaged areas that would expose employees to an electrical hazard. 2. **Strain Relief.** Strain relief of cords and cables shall be maintained to prevent pull from being transmitted directly to joints or terminals. 3. **Repair and Replacement.** Cords and cord caps for portable electrical equipment shall be repaired and replaced by qualified personnel and checked for proper polarity, grounding, and continuity prior to returning to service.
Extensions Cords Are you using temporary wiring as permanent wiring?	Temporary wiring is for any installation that will be in service for less than thirty (30) days.
Slip /trip/fall Are pathways clear of electrical cords?	Route the electrical cords so they do not lie across pathways. Use hooks and other devices to collect or secure cords. Keep cords short. Long cords on the floor are a great hazard for slips, trips and falls.

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Electrical Panels and Switchboards Is access to electrical panels and switchboards blocked?"	Minimum clearance distance in front of panels, switchboards, disconnects, etc. is 3 feet (one-sided panels rated below 600 volts). Should have at least 36 total inches measured from side to side.

References:

- NFPA 70 E 2018 ARTICLE 205, General Maintenance Requirements, 205.14
  - Current List of NRTLs — Nationally Recognized Testing Laboratory Program
- NFPA 70 E 2018 ARTICLE 350, Safety-related Work Requirements: Research and Development Laboratories, 350.10
  - UC Lab Design Manual