

Questions have been asked about electrical safety that includes extension cords, GFCI's and adapters.

Here are some the rules we follow here at the lab out of Pub 3000 chapter 8 & 10

## **Chapter 8 ELECTRICAL SAFETY**

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Approved by Keith Gershon  
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#### **8.13.4 Extension Cords**

Extension cords provide a convenient method of bringing ac power to a device that is not located near a power source. They are used as temporary power sources. Extension cords are probably involved in more electrical-code and safety violations than any other device at the Laboratory. They are stepped on, stretched, cut, overloaded, and, in general, used improperly.

#### **Guidelines for the Safe Use of Extension Cords:**

- Use only approved and properly maintained extension cords that have no exposed live parts, exposed ungrounded metal parts, damage, or splices.
- Use only heavy-duty or extra-heavy-duty rated cable.
- Use extension cords that are protected by a ground fault circuit interrupter (GFCI) around construction sites, in damp areas, or in an area where a person may be in direct contact with a solidly grounded conductive object (e.g., working in a vacuum tank (metal to ground). The GFCI can consist of a special circuit breaker, a GFCI outlet, or an extension cord with a built-in GFCI.
- Ensure that the extension cord is of sufficient current-carrying capacity to power the device. Use of an undersized cord results in an overheated cord and insufficient voltage delivered to the device, thus causing device or cord failure and a fire hazard. Undersized cords also constitute a serious shock hazard as it may not allow the breaker feeding it to trip. (No less than 14 gauge)
- Always use three-conductor (grounded) extension cords—even if the device has a two-conductor cord. Never use two-conductor extension cords at the Laboratory.

**Avoiding Misuse of Extension Cords:** Observe the following restrictions to avoid misuse of extension cords:

- Do not use extension cords in place of permanent facility wiring.
- Avoid running extension cords through doors, ceilings, windows, or holes in the walls. If it is necessary to run a cord through a doorway for short term use, ensure that the cord is:
  - Protected from damage.
  - Removed immediately when no longer in use.
  - Not a tripping hazard.
  - Added Note: Cords that are twisted on the inside but not broken need to be replaced. This happens when cords are run over by vehicles/Scissor lift ect.. This is added when plywood or masonite is laid on top of a cord rolled over.
- **Do not daisy chain extension cords (i.e., plug one extension cord into another extension cord).**
- Do not overload extension cords. Make sure that the wire size is sufficient for the current required.
- Do not cut off the ground pin of an extension cord or compromise the ground protection in any way.
- Do not use extension cords with a ground conductor that has less current-carrying capacity than the other conductors.
- Do not use frayed or damaged extension cords.
- Never splice extension cords, even for a repair. If an extension cord is damaged, it may be made into two cords, provided the proper connectors are used in a proper manner. Only qualified personnel may install cord caps for use with potentials greater than 50V.
- Only qualified personnel may make repairs of extension cords.
- **An extension cord that ends with a splitter or Y may feed individual tools and other loads. It may not feed other extension cords or another splitter or Y.**

#### 8.13.5 Relocatable Power Taps (Power strips)

- **Relocatable power taps are not approved for construction sites or for outdoor use.**

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The regulation below is reference to a (homemade splitters, “radar boxes”) relocatable power tap. Using listed products or equipment for use they were not intended for.

#### **1910.303(b)(2)**

*Installation and use.* Listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling.

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## Chapter 10

### CONSTRUCTION SAFETY MANUAL ADMINISTRATIVE POLICIES

#### Appendix A. Code of Safe Practices

##### A.3.1 Scope and Application

Use of electricity on construction job sites poses serious hazards, such as electrocution, burns, fires, explosions and arc flash/blast. All construction work performed by LBNL employees as well as subcontractors shall comply with applicable local codes/regulations, federal and California state OSHA standards, and other codes/regulations such as, but not limited to, NFPA codes (i.e. National Electrical Code (NFPA 70), NFPA 70E, Standard for Electrical Safety in the Workplace, NFPA 79, Electrical Standard for Industrial Machinery), and the National Electrical Safety Code (ANSI C2). The most current versions and stringent requirements shall always apply. In addition, compliance with all elements of this section and PUB-3000 is required. Requirements specific to electrical are found in [PUB-3000, Chapter 8](#). Electricians and apprentices shall be certified in accordance with California law, and shall carry certification cards.

##### A.3.2 Ground Fault Circuit Interrupters

All 120-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are in use by employees shall be protected by approved GFCIs. Receptacles other than 120-volt, single-phase, 15-, 20-, and 30-ampere receptacles shall be protected by approved GFCIs, or a written assured equipment grounding conductor program shall be continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained properly. The program should conform to the requirements of OSHA Standard 29CFR 1926.404(b)(iii). Workers shall test GFCI receptacles according to the manufacturer's instructions before each use.

##### A.3.3 Electric Power Tools

All subcontractors shall have a system in place for routine testing and maintaining of electrical tools, equipment, extension cords, and other electrical equipment. The program shall be in writing, with a copy provided to LBNL Construction Safety Engineer for review.

Tools with damaged cords, damaged cord caps, missing or damaged covers, missing grounding pins, or other damage that may affect the safe use of the equipment shall be removed from the project. All electrical equipment (such as saws, hammers, drills, vibrators, and float machines) shall bear the label of a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories (UL), CSA, ETL, or the like.  
**(Homemade splitters, "radar boxes") are not UL listed assemblies, and therefore are prohibited.**

All tools shall be of the grounding type. Cord-connected tools shall be grounded through an approved grounding attachment plug.

**Exception:** Tools identified as “Double Insulated” are not required to be grounded.

#### **A.3.4 Electric Equipment**

Stationary electric equipment with exposed metal parts like housings, boxes, and hoist frames shall be grounded.

#### **A.3.5 Extension Cords**

Only heavy-duty cords identified as hard or extra-hard usage (see NEC Table 400.4) (such as types S, ST, SO, STO) are acceptable. Cords shall be maintained in their original designed configuration. Any cord that is damaged or has a grounding pin removed shall be removed from service.

The subcontractor shall remove cords that have been spliced or repaired from project site. There will be no repair or taping of cords in any manner. The gauge of wire of the cord shall be sized for the designated use, but in no case less than 14 gauge. For an overall length over 100 feet, one size larger than required for the connected load shall be used. All extension cords shall be plugged into job-site power that has proper over current and ground-fault protection.

All extension cords shall be kept out of walkways and out of wet conditions on the floor.