



**Title: ELECTRICAL SAFETY**

**Principle:**

Because of the tremendous number and variety of electrical equipment used in the laboratory, knowledge of electrical safety rules is very important. It is the responsibility of all to adhere to safe electrical practices.

**Procedure:** Please adhere to all safe electrical practices as described below:

**A. General electrical Safety**

1. All laboratory equipment must be connected to grounded, i.e., 3-wire receptacles.
2. All electrical appliances must have UL, or other nationally recognized testing laboratory, approval.
3. The cords of all electrical equipment must be in good condition, i.e., not frayed or spliced, or the equipment must be removed from service until repairs are done.
4. Each electrical socket must have only one "plug in" per socket outlet.
5. Do not work near electrical equipment or outlets when hands, counters, floors, or equipment are wet.
6. Consider defective as any device that blows a fuse more than once or trips a circuit breaker. Immediately remove equipment from service, attach a conspicuous tape to the device which reads, "**Defective - Do Not Use**," and report the problem to your supervisor.
7. Do not use any electrical equipment, appliance, or wall receptacle that appears to be damaged or in poor repair.
8. Report all shocks immediately (even small tingles may indicate trouble and precede major shocks). Do not use the equipment again until it is inspected and repaired.
9. Do not attempt to repair any instrument while it is plugged in, i.e., any portion where you have contact with circuit boards, power supplies or other electrical connections. The exception to this is the calibration of instruments that require adjustment in an operational phase. In this case, be sure hands are dry, remove all jewelry (watches and rings) and proceed with caution.

10. Do not, under any circumstances, attempt to bypass the safety/electrical interlocks which exist on equipment.
11. Do not repair, or attempt to repair, any of the building circuitry, i.e., switches, outlets, circuit boxes, fuses, circuit breakers, etc. Refer all such repair to Maintenance.
12. If equipment will be used in a wet location, consult with Bioengineering before use about any additional safety requirements. All recommendations must be documented in the equipment procedure manuals.
13. If electrical equipment will be used in potentially hazardous atmospheres, e.g., where flammable gases are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures, consult with the equipment manufacturer and with Bioengineering before use about any additional safety requirements. All recommendations must be documented in the equipment procedure manuals.
14. Know the location of all building electrical breaker boxes so that electrical current can be shut off in an emergency. Do not place any items in a position to obstruct or cover any breaker box.

**B. Electrical Checks**

1. All fixed, electrical receptacles must be checked at least annually for ground integrity. Each laboratory section is responsible to ensure that electrical receptacles are checked annually. The safety checks are scheduled with the UCHSC Bioengineering Department. Documentation of the checks must be done either with date and initialed stickers attached to each receptacle or other written documentation from Bioengineering.
2. All laboratory instruments and devices (including portable equipment and tools) must be checked for adequate grounding and for current leakage prior to initial use and at least every 12 months afterwards. Each laboratory section is responsible to assure that the ground and current checks are done. The safety checks are scheduled with the UC Denver Bioengineering Department. Written documentation must be provided to the lab by Bioengineering and stored with the maintenance records of each piece of equipment. Inspection schedules and records are also maintained in the Bioengineering Department.
3. All personal electrical equipment, such as coffee pots, fans, refrigerators, radios, tape records, VCRs, and microwave ovens must be visually inspected every 6 months in each laboratory section:

- a. By examining the power cord for nicks, frayed insulation, exposed wires, etc.
  - b. By examining the case, housing, chassis, etc., for defects that may indicate a safety hazard.
  - c. By operating the item and checking for unsafe conditions that may develop.
  - d. By removing any suspected unsafe equipment from use.
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Records of these checks must be kept in the laboratory section where the checks are done.

#### C. **Extension Cords**

1. Extension cords are prohibited in University Hospital **patient care areas** except in emergency situations.
2. In the laboratory, extension cords for ongoing electrical connections may be used if approved by the Hospital Director of Safety and/or the Director of Bioengineering. Extension cords should not be used:
  - a. As a substitute for fixed wiring.
  - b. To run through holes in walls, ceilings or floors.
  - c. To run through doors, windows, etc.
  - d. Attached (e.g., taped) to building surfaces.
3. In the laboratory, extension cords may be used to provide emergency connections to equipment in the event of power outages or equipment failure; as a temporary electrical connection between new equipment, refrigerators, etc., while they are being tested for use or while remodeling is going on. If used, the extension cords must be connected without any tension on joints or terminal screws. They must not be used across areas of egress or where they might pose a tripping hazard.

#### D. **Flammable Liquids**

1. Do not store highly flammable liquids near electrical equipment.
2. Use cleaning solvents carefully around electrical equipment.

#### E. **Fuses**

1. Do not replace a fuse in a piece of equipment with any fuse other than that designated by the manufacturer. Over-fusing or under-fusing is prohibited. In an emergency

situation, an exception can be made by the Director of Bioengineering or can be done if the laboratory supervisor is directed to do so by maintenance/repair personnel from the vendor of the equipment. Any changes in a designated fuse are considered a temporary measure only and must be documented.

2. Do not replace a fuse in a piece of equipment more than once. If the fuse continues "to blow," consider the equipment defective and remove from service. (See also section on General Electrical Safety.)

**F. Multiple Outlet Boxes**

1. In the laboratory, multiple outlet boxes may be used if they have a breaker and a reset button. It is preferable, when possible, to have multiple outlet boxes permanently mounted.

**G. Signs**

1. Mark all high voltage equipment and power supplies with signs stating "High Voltage."
2. Mark all breaker boxes with signs stating "Breaker Box."

**Written by:** Heather Currens, SCT (ASCP), 8/13/2008

**Revised by:** Gail Zander, CT (ASCP), 8/18/2012

**References:** GEN.75900

**Approval of Procedure:**

Medical Director Signature: *Dr. Scott Zander, MD*

Date: 8/29/12

