

Electrical Safety

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Research Safety

Office of Research

UNIVERSITY OF GEORGIA

I. Purpose & Scope

This document is meant to provide an overview of the University's requirements and recommendations for the safe use of electrical equipment, including power strips, surge protectors, and extension cords. Improper use of these items can cause fires in the labs and adherence to the established procedures must be followed. Please note that individual research areas may have additional requirements not detailed in this document.

II. Definitions

Collectively, the following three items will be called "flexible cords and cables" throughout this SOP.

A. Extension Cords

An elongated power supplying device that allows for the safe distribution of power usually to a single piece of equipment located from a standard wall outlet.

B. Power Strips (Relocatable Power Tap)

Similar to an extension cord except that they are usually capable of powering more than one device. It should not be assumed that these items are providing surge protection unless otherwise indicated on the device itself.

C. Surge-Protective Device (SPD)

Electrical code defines this as a device for limiting transient voltages by diverting or limiting surge current. The most common type of SPD used in labs is a Type 3 meaning that the surge protection is provided at the point of use. A surge protected power strip with multiple outlets is commonly a Type 3. To tell if your device is an SPD, you will need to consult the packaging or look at the raised lettering or adhesive label on the bottom of the device. Note that the device may also say Transient Voltage Surge Suppressor and this is sufficient as well.

III. General Safety Guidelines

- Electrical panels and breaker boxes located in the lab should not be obstructed by equipment or lab supplies.
- Particular care should be given not to subject wiring or equipment to deteriorating agents such as gases, fumes, vapors, liquids, foot traffic, sharp edges, or damp

environments that may compromise the protective features of a piece of equipment of electrical cord powering a device.

- Any portion of an electrical device that during the course of normal operation may produce arcs, sparks, flames, or molten metal shall be enclosed or separated and isolated from all combustible material.
- Any wiring or electrical equipment used in a lab should have a label or tag indicating the voltage, current (amps), wattage, and other ratings as necessary.
- Minimize condensation that may enter electrical equipment that is placed in a cold room or large refrigerator. Cold rooms pose a particular risk in this respect because the atmosphere is frequently at a high relative humidity. Electrical equipment should only be used in these areas temporarily. If permanent or long-term storage is required, precautions should be taken to mount the equipment on a wall or vertical panel to minimize (though not eliminate) the effects of condensation.
- Always unplug electrical equipment before undertaking any adjustment, modification, or repair.
- Ensure that all personnel know the location and operation of power shutoffs located in the lab.
- If a person comes into contact with a live electrical conductor, disconnect the power source before removing the person from the contact and administering first aid.

IV. Wall Outlets

- All outlets within a laboratory should be grounded (three-pronged) outlets and all electrical equipment used in a laboratory should be outfitted with a grounding prong. No modifications should be made to either the outlet or the electrical cord to either add or remove a grounding wire or bypass a grounding receptacle.
- Any outlet that is within six feet of a water source must be outfitted with a ground fault circuit interrupter (GFCI). These GFCI outlets will usually have small Test/Reset buttons to test the functionality of the GFCI. These devices significantly reduce the risk of fatal electric shock.
- Outlets and light switches located underneath or near safety showers in particular may need additional protection of a plastic cover. When these items are in place, they should never be removed by laboratory personnel under any circumstances.

V. Use of Extension Cords, Power Strips, and Surge Protectors

- Only flexible cords and cables that have been certified by one of OSHA's Nationally Recognized Testing Laboratories (NRTL) are allowed to be used in UGA laboratories. The most common NRTLs are UL and ETL. Both testing laboratories will place their symbol on the equipment that they have certified.
- Flexible cords and cables that are supplying power to operations within a fume hood should be plugged into power sources located outside of the fume hood. This location prevents the production of electrical sparks inside the hood when a device is being plugged in or disconnected and it also allows lab personnel to disconnect equipment from outside of the hood in the event of an accident. Additionally electrical cords should be placed in such a way that they do allow for the full closure of the sash.

When closed, the sash should always come into full contact with the airfoil.

- Keep these flexible cords and cables out of aisles or other high traffic areas. Install overhead racks or floor channel covers if wires must pass over or under walking areas.
- SPDs should be used in areas where the consistency of electrical current is vital (e.g., computers). Commonly, laboratories are found to be using power strips that do not provide surge protection. Ensure that the device you are using is rated as an SPD if current consistency is preferred.

VI. Limitations of Flexible Cord & Cable Use

- Extension cords should be limited to temporary use (90 days or less). They are not intended to permanently replace the fixed wiring of the building. If a lab determines that new fixed outlets may be needed in order to avoid utilizing extension cords for longer than 90 days, please contact the Office of Research Safety.
- Flexible cords and cables should not be run through holes in walls, structural ceilings, suspended ceilings, dropped ceilings, floors, doorways, windows, or similar openings. They should not be concealed by walls, floors, ceilings, or located above suspended or dropped ceilings.
- It is recommended that all cords be visually inspected monthly, especially in wet areas or in areas subject to flooding. Electrical equipment and flexible cords and cables where the insulating wire casing is frayed or ripped open should not be utilized. Electrical tape is not an acceptable repair solution. If the lab would like the cord replaced or repaired, please contact the UGA Instrument Design and Fabrication Shop.
- Flexible cords and cables should never be connected in series (i.e., multiple extension cords or power strips plugged into one another). Doing so can overload the device causing a fire hazard.
- Flexible cords and cables should never be overloaded. This can be a particular concern with power strips because of the likelihood that multiple pieces of equipment could be plugged into each device. Large pieces of equipment (e.g., refrigerators and freezers) that pull high amperage are not allowed to be plugged into power strips in most cases. If your lab needs the addition of wall outlets or some other solution to prevent having to use a power strip for these purposes, please contact the Office of Research Safety.

VII. Contacts

Environmental Safety Division: 706-542-5801

Office of Research Safety: 706-542-5288

Instrument Design and Fabrication Shop: 706-542-5993

VIII. References

Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards,

National Research Council, 2011

NFPA 45: Standard on Fire Protection for Laboratories, National Fire Protection Agency, 2015

NFPA 70: National Electrical Code, National Fire Protection Agency, 2011