

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-014	
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ELECTRICAL SAFETY

The University of Pittsburgh is committed to safety in all aspects of operation. These guidelines were developed using national standards for electrical safety, so that a safe environment is maintained for faculty, staff, students and visitors.

The addition or alteration of permanent wiring, lighting or other electrical components requires the involvement of Facilities Management, Housing Facilities, or Property Management. Theatrical groups may add or alter temporary lighting, wiring or other appropriate electrical components provided that electrical safety standards are maintained. All electrical repairs must be done by qualified individuals.

The following guidelines are not all-inclusive. They are given as fundamental advice to be applied in all situations. For additional information, contact the Department of Environmental Health and Safety 412-624-9505, the Department of Facilities Management 412-624-9500 or utilize the references provided at the end of this document.

1. Controlling Electrical Hazards

- 1.1. Never clip off ground pins on three-wire appliances or use two-wire adapters to wed incompatible equipment.
- 1.2. Never use substandard two-wire household appliances, lamps, hair dryers and power bars.
- 1.3. Never touch bare wires.
- 1.4. Never intentionally overload a circuit.
- 1.5. Never bypass fuses or circuit breakers.
- 1.6. Always keep electrical service and breaker panels accessible. These electrical panels should have 36 inches of clearance in front and a 3-foot-wide aisle leading to them. It helps to mark the floor around the area that must remain clear.
- 1.7. Circuit breakers and fuse boxes must be either recognizable or labeled. Outlets, switches and junction boxes must be covered. All electrical boxes must be secured to the wall.
- 1.8. Install ground fault circuit interrupters (GFCI) on any outlet in damp or wet locations, or within 6 feet from wet locations or water sources such as sinks. Also install GFCIs on outlets frequently used for power tools.
- 1.9. Do not perform electrical work in damp locations or put a drink where it could spill in an electrical device or electronic component.

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- 1.10. Lockout/Tagout procedures must be followed when equipment is de-energized. Call EH&S for more information on the University's Lockout/Tagout Program.
 - 1.11. Only trained and authorized electricians should remove covers from electrical panels.
 - 1.12. Electrical equipment that malfunctions should be immediately removed from service.
 - 1.13. Unplug any lighting instrument before changing the lamp.
 - 1.14. Always disconnect a plug by pulling on the connector body not the cable. Disconnect any device from the circuit before service.
 - 1.15. Use wooden or fiberglass ladders when working on elevated electrical jobs (such as hanging and focusing lights). If metal ladders must be used, they must be insulated with high quality rubber footpads. Moveable metal scaffolds or adjustable ladders should have lockable rubber casters.
2. Temporary Wiring and Extension Cords
- 2.1. Coil temporary wiring neatly and keep flexible cable out of traffic areas. Cover wires that cross walkways with treadles.
 - 2.2. Check cable, cords, and connectors periodically and immediately replace any items that show signs of cracking, chipping or other deterioration.
 - 2.3. Remove any grease, dust, or other accumulations from cables and connectors. These substances can act as insulation between the contacts of the connector, and they can pose a fire hazard.
 - 2.4. Temporary cables, cords and wiring must not be spliced. Use proper connectors and terminations.
 - 2.5. Extension cords and power strips.
 - 2.5.1. Use of extension cords should be avoided. Extension cords are intended for temporary use only and should not exceed 90 days. If additional wall receptacles are needed, contact the facility manager for your building (e.g. Facilities Management, Housing, and Property Management).
 - 2.5.2. Standard power strips are designed for use with low wattage electronic equipment. High wattage appliances, including but not limited to freezers, refrigerators, copy machines, space heaters, microwave ovens, toaster ovens, and other cooking and laboratory equipment must not be supplied power via extension cords or power strips. High wattage appliances must be plugged directly into a wall receptacle.

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- 2.5.3. Extension cords must not be connected in series. Power strips must not be connected in series or be used with extension cords.
- 2.5.4. Refrigerators and cooking appliances should be used only in designated kitchenettes and other areas where suitable wall receptacles with proper circuit capacity for power requirements have been provided. Location and use of cooking devices outside of designated areas can result in unnecessary fire hazard, electrical shock hazard, tripping of circuit breakers, and activation of smoke detectors and/or the building's fire alarm system.
- 2.6. Use extension cords that have GFCIs built into them.
- 2.7. Do not run flexible cords through holes in windows, doors, ceilings, floors, or walls. Cords may not be attached to building surfaces.
- 2.8. Avoid stretching or pinching cords between objects, and do not cover electrical cords with rugs. This can break interior wires, causing overheating and fires.
- 2.9. Cable running beyond 25 feet should be avoided as it may increase electrical resistance beyond its normally rated capacity.
- 2.10. Theatrical lighting is temporary wiring. All NEC codes and OSHA regulations applicable to temporary wiring apply to theater lighting.
 - 2.10.1. Be sure personnel, students, and trainees know the location of the master switch for stage lighting equipment.
 - 2.10.2. Permit only authorized and trained personnel to work on lighting. Make sure that everyone knows his or her responsibilities as defined by a job description (in the *Handbook of Theatrical Apprentices* or some other suitable set of formal guidelines).
 - 2.10.3. Arrange work schedules so that no other activities take place on stage while lights are being hung or focused.
 - 2.10.4. Before hanging lights, crewmembers should make sure that there is nothing on their persons that would fall to stage level.
 - 2.10.5. Portable light bulbs, including backstage lighting, should be guarded.
 - 2.10.6. All lighting stands must be properly secured.
 - 2.10.7. Portable stage switchboards must be connected to outlets of sufficient voltage.

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2.10.8. Never overload dimmer boards. Make sure there is a completely dead (non-conducting) front on dimmers and light boards.

2.10.9. Report to a supervisor immediately after the detection of any irregularities, defective equipment or incidence of electric shock.

3. Power Tools for Electrical Safety

- 3.1. Purchase only power equipment that is either grounded or double insulated. A grounded tool has a three-conductor cord with a three-pronged plug that must be plugged into a grounded outlet. A double insulated tool has a two-conductor cord and a special insulation system that does not require grounding. These tools should have a label or a symbol on them indicating that they are double insulated.
- 3.2. Never carry a power tool by the cord.
- 3.3. Unplug power tools before loading them, changing blades or bits, adjusting or cleaning them.
- 3.4. Never use electrical power tools on wet surfaces or in wet weather.
- 3.5. Never alter or remove machine or blade guards.
- 3.6. Eye protection should be worn when performing tasks with potential to generate flying particles or debris. Most power tool related tasks generate such hazards.
- 3.7. Consult EH&S or the University of Pittsburgh Shops Safety Manual for more information on power tool safety.
- 3.7.