EHRS
Environmental Health & Radiation Safety
University of Pennsylvania

Occupational Safety Fact Sheet

Electrical Safety

DESCRIPTION

The objective is to provide basic information regarding electrical safety and guidance for maintaining a safe environment for the Penn community.

ELECTRICAL HAZARDS

Hazards associated with electricity and electrical devices include burns, shocks, electrocution and fire. Contact with current from standard 110-volt circuits may be lethal.

APPROVED ELECTRICAL PRODUCTS

Insure that all electrical devices and components are labeled by a nationally-recognized testing laboratory such as Underwriters Laboratories (UL), Factory Mutual (FM) or equivalent. Use must be consistent with the listing/labeling conditions and the manufacturers' instructions.

GUARDING OF LIVE PARTS

Electrical components including switches, outlets, junction boxes, wire raceways, circuit breaker panels, etc. must be guarded to prevent accidental contact with live electricity. If you observe exposed wiring, please contact your building administrator to have covers installed.

GUARDING OF LAMPS

Lamps used for general illumination located within seven feet of the floor must have a cage or guard to prevent breakage of bulbs and contact with live electrical parts.

EXTENSION CORDS

Extension cords may not be used as a substitute for permanent outlets. They may only be used for temporary applications. The cords must be labeled as having been tested by a nationally-recognized testing laboratory and be rated for the load they are supplying. Extension cords may not be connected to one another and they may not be run through doorways, windows, holes in walls, floors, ceilings, etc.

OUTLET SPLITTERS/OUTLET CUBES

The use of outlet splitters/cubes is discouraged. These devices tend to pull away from the outlets which can lead to overheating and has resulted in fires. Ideally, additional outlets should be installed as required by a qualified electrician. If outlet splitters/cubes must be used, insure that they are labeled as having been tested by a nationally-recognized testing laboratory and that they are properly rated for the load they will supply. Outlet cubes must be attached to the outlet with a screw that replaces the outlet face plate screw.

INSPECTION/REPAIR OF CORDS

Inspect all cords for missing ground prongs and worn/frayed jacketing or exposed conductors. Cords found to be defective must not be used. Cords should be destroyed and disposed of or repaired/replaced by a qualified electrician. Electrical tape may not be used to repair worn or frayed cords.

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GROUND-FAULT CIRCUIT INTERRUPTER (GFCI)

A ground-fault circuit interrupter (GFCI) is a device that is designed to quickly detect a ground fault and interrupt power in order to prevent a lethal shock. Typically, the device is contained at a branch circuit breaker or an individual outlet. GFCIs are required by code in areas close to sinks and other sources of water. A GFCI outlet should be tested monthly by plugging a device into it and pushing the test button on the outlet. The device should shut off. Power to the device should be restored when the reset button on the outlet is pushed. If the GFCI is found to be defective, discontinue use of the outlet and label it "Defective-Do Not Use" Contact your building administrator or submit a Facilities Services work request to have the outlet repaired or replaced.

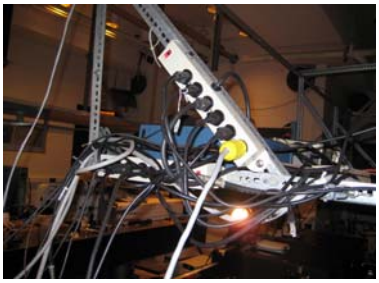
POWER STRIPS/SURGE PROTECTORS

Power strips/surge protectors must have built-in circuit breakers. They must be connected directly to a wall outlet and never be connected to one another or an extension cord. The ampere & voltage capacity of the device must be clearly indicated and it must be labeled as having been tested by a nationally-recognized testing laboratory. Applied load must be within the acceptable range listed on the device. Light-duty household-type devices are not appropriate for use in University facilities. Heavy-duty devices with various cord lengths are available from industrial and laboratory supply vendors in Penn's Ben Buys online purchasing system.

GROUNDING

Circuits, devices and enclosures must have a permanent and continuous path to ground. Ensure that ground prongs on power cords are intact and have not been broken off or removed. All outlets must have the provision for three prong plugs. Contact your building administrator to have two prong outlets converted to three prong grounded or GFCI outlets. Plug adapters should not be used.

ELECTRICITY IN THE LABORATORY



It is important to evaluate the quantity and locations of electric receptacles required to properly support current research. As the electrical demands of research increase, the lab infrastructure must be updated to accommodate these changes. The use of extension cords may not be substituted for inadequate quantity or placement of permanent outlets. Contact your building administrator to facilitate the installation of permanent receptacles as required. Electrical work in the laboratory, including experiments and equipment, must be completed under the direction of a "qualified person" as defined by NFPA 70E Article 100 to ensure safety and code compliance.

REFERENCES

Factory Mutual Global
National Fire Protection Association (NFPA) - NFPA 70
Occupational Safety & Health Administration- (OSHA)
29 CFR 1910 – Subpart S – Electrical
Philadelphia Fire Code/International Fire Code
Underwriter's Laboratories Inc.