



Electrical Safety Plan

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I. Purpose

This Plan establishes policies and procedures to achieve minimum acceptable standards for electrical safety-related work practices; which includes requirements for the comprehensive training of qualified and unqualified workers relating to the use of personal protective equipment, proper use of tools while working on and near electrical apparatus, testing procedures, working with specialized fixed equipment for various job functions, understanding working clearance, determining nominal voltages and identifying exposed energized parts. Training information for site or job-specific procedures is given to employees through additional classroom and on-the-job training. This Plan is intended to support compliance with the Occupational Safety & Health Act (OSHA) Regulations 29 CAR 1910.269, Subpart S, National Fire Protection Association (NFPA) Standard 70E, and other pertinent standards or local laws are incorporated in this program by reference.

See also Tufts University Lockout Tagout Plan (1910.147)

Policy on Building Equipment and Devices which use electricity to operate over 50 V

Faculty, staff and students generally use equipment and devices designed by qualified electrical engineers and electricians and constructed in accordance with Underwriters Laboratory and Canadian Safety Association codes to protect the operator of the device from contact with energized electrical conductors.

Tufts University requires that all such devices be evaluated by qualified workers such as a licensed electrician before connecting such devices to an electrical power source e.g. before plugging it in!

II. Objective

- a. Avoid injuries related to energized electrical contacts.
- b. Establish training requirements for persons handling electrical devices.
- c. Provide guidance in determining the level of protection (PPE) required to perform specific electrical distribution circuit and electrical device tasks.

III. Scope

This program applies to all employees with exposure to electricity through the operation of switches, controllers, lockout procedures, power supply installations or maintenance with direct exposure to energized parts. *It is not the intent of this Plan to detail procedures required to protect equipment, apparatus or wiring systems.*

a. **Supervisors**

It is the supervisor's responsibility to enforce the use of this Plan. Supervisors are responsible for the identification of and correction of potential electrical safety hazards covered by this policy. Supervisors are expected to identify employees requiring specialized training to safely complete their tasks relative to this policy, to become Qualified Persons at Tufts. Conduct periodic inspection using the *Worksite Observation Form* to insure safe work practices are followed and that personal protective equipment (PPE) is available and tested as required.

b. Employees

All employees are required to comply with this policy. Any concerns related to electrical safety should be reported to supervisors.

c. University Departments

Each University department is responsible for the implementation of the policy within their respective departments. While there are no specific training requirements associated with this policy, any specialized training that may become necessary will be the responsibility of the Department to provide.

d. Tufts Environmental Health and Safety (TEHS)

TEHS is responsible for the periodic review and updating this policy. TEHS will also assist in basic electrical safety presentations when requested. Inspections to monitor compliance will be performed by TEHS on a routine basis.

IV. Definitions

- a. **Approach Distances** – Must be established whenever work is to be conducted on electrical systems or components not in an electrically safe work condition.
 - **Flash Protection Boundary** – Distance beyond which appropriate flash protection equipment is required to prevent incurable 2nd degree burns.
 - **Limited Approach Boundary** – Shock protection boundary designed to keep nonqualified persons at a safe distance away from exposed electrical components
 - **Restricted Approach Boundary (OSHA Minimum Approach Distance)** – Secondary shock protection measure whereby accidental movement can put a body part or conductive object in contact with live parts. Approach distances listed in Table 1 represent minimum distances required between energized parts to an unprotected person or equipment.
 - **Prohibited Approach Boundary** – Point at which is considered to be touching the exposed energized part.
- b. **Dead Front** - without live parts exposed to a person on the operating side of the equipment.
- c. **Disconnecting Means** – A device by which the conductors of a circuit can be disconnected from their source of electrical supply. As an energy isolation control, it shall have the capability of being locked out.
- d. **Enclosure** – A case or housing of apparatus surrounding an installation to prevent personnel from accidentally contacting energized parts. If the enclosure is conductive it must be grounded or bonded to a grounding system.
- e. **Exposed** – Capable of being inadvertently touched or approached nearer than a safe distance by a person. Not insulated.
- f. **Fault-clearing time** - the timing required for the nearest circuit protective device (i.e., circuit breaker or fuse) to operate to clear a fault, typically in milli-seconds.
- g. **Flash hazard analysis** - a study investigating a worker's potential exposure to arc-flash energy, conducted for the purpose of injury prevention and the determination of safe work practices and appropriate levels of personal protective equipment.
- h. **GFCI** - Ground Fault Circuit Interrupter. A device intended for the protection of personnel that monitors the amount of current flowing from hot conductor to neutral conductor and interrupts the circuit if there is an imbalance of more than 4-5 milliamps.
- i. **Ground** – A conducting connection to the earth
- j. **Grounded** – A conducting connection to the earth

- k. **Guarded** – Covered, shielded, fenced, enclosed to otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats or platforms to remove the likelihood of approach to a point of danger or contact by persons or objects.
- l. **Incident energy** - The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event.
- m. **Isolated** – Not readily accessible to persons unless special means for access are used.
- n. **Qualified Worker** – One familiar with the construction and operation of the equipment and the associated hazards that has skills and knowledge related to the construction and operation of the electrical equipment and installations and received safety training on the hazards involved. (Synonyms for this term include: qualified worker, qualified employee and qualified designee)
- o. **Non-Qualified/ Unqualified Worker** – One who is not exposed to hazards and will not approach exposed parts of electric circuits operating at 50 volts (DC or AC) or more to ground. Persons with little or no electrical safety training. An employee undergoing on-the-job training who has demonstrated the ability to perform duties safely at his/her level of training, and who is under the direct supervision of a qualified person, is considered to be a qualified person for the purpose of those duties.
- p. **Sleeves** - Rubber insulating sleeves extend coverage for a person's arm from the cuff of the rubber insulating glove to the shoulder, fully protecting these areas from accidental contact with energized conductors and equipment.
- q. **Short circuit current** - is the maximum electrical current which can flow in a particular electrical system under short circuit conditions

V. Training

The training requirements contained in this section apply to employees **who are exposed to a risk of electric shock that is not reduced to a safe level by equipment and system compliance with electrical code and installation requirements**. Employees that face such a risk are required **to be trained and tested as a qualified (electrical) worker**. *Other employees who may reasonably be expected to face comparable risk of injury due to electric shock or other electrical hazards must also be trained.*

- a. Training
 - 1. The training required by this section may be of the classroom or on-the-job type. The degree of training provided must be determined by the risk to the employee.
 - 2. Content of Training – Qualified employees shall be trained in and familiar with the safety-related work practices that pertain to their respective job assignments.
 - 3. Frequency of Training - For the purposes of this document a person must have the above training in order to be considered qualified. Qualified persons whose work on energized equipment involves either direct contact or contact by means of tools or materials shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials and insulated tools. New hires shall be trained upon assignment. Refresher training shall be done if a deficiency is identified during an audit using the Worksite Observation form (Attachment B) but should not exceed once annually. Training shall be documented including signature by the employee.
- b. Supervisors must ensure that employees who face a risk of electrical shock in their work are trained in accordance with this policy.
 - 1. **Qualified persons** (i.e., those permitted to work on or near exposed energized parts) shall, at a minimum, be trained in and familiar with the following:

- Electrical Hazards and Safety Awareness for Qualified Persons training, provided by TEHS.
 - The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment;
 - The skills and techniques necessary to determine the nominal voltage of exposed live parts; and,
 - The clearance distances specified for working on or near exposed energized parts and the corresponding voltages to which the qualified person will be exposed.
 - Specific approach boundaries (i.e., flash protection boundary, limited approach boundary, restricted approach boundary and prohibited approach boundary) specified in Table 1.
 - Qualified persons whose work on energized equipment involves either direct contact, or contact by means of tools or materials, must be trained on how to work safely on energized circuits. These employees must be familiar with proper precautionary work practices, personal protective equipment, insulating and shielding materials, and the use of insulated tools.
 - A demonstration of employee's knowledge shall be documented. This can be a written test, documentation of successful completion of training, or by onsite demonstration of understanding through workplace observations, or physically demonstrating a hazard analysis, choosing and donning the proper PPE, and performing LOTO and proper testing techniques. Each employee should be evaluated at least annually to ensure continued understanding by using Form B (attached).
 - Each qualified electrical worker shall be instructed in CPR, First techniques, and methods to safely release a worker from electrical contact.
- 2. Non-Qualified/ Unqualified Worker**
- Employees who are not qualified persons shall also be trained in and familiar with any electrically related safety practices not specifically addressed in this document but which are necessary for their safety. Employees whose job duties do not bring them close enough to the exposed parts of electrical circuits for a hazard to exist (operating at 50 volts or more to ground), shall receive Electrical Safety/LOTO Awareness Training for Unqualified Persons.
 - a.) Use power tools
 - b.) Perform service on machines or equipment
 - c.) Perform maintenance or repair functions as part of their job.
- 3. Other**
- Employees whose job duties do not bring them close enough to the exposed parts of electrical circuits for a hazard to exist (operating at 50 volts or more to ground), are not required to receive training under this policy.

VI. Work Procedures

The following procedures apply to both qualified and non-qualified personnel unless specifically referenced to qualified employees.

- a. **Job Briefing** – Before starting each job involving exposed live equipment, the employee in charge shall conduct a Job briefing with the employees involved. The briefing shall cover the following:
 - Hazards associated with the job where applicable
 - Work procedures
 - Special precautions
 - Energy source controls

- Personal protective equipment
 - 1. Additional job briefings shall be conducted if significant changes that might affect the safety of the employee occur during the course of the work.
 - 2. If working alone, the items listed above shall be carefully considered before working on or near energized systems.
- b. Safe Work Practices: Selection and Use – Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from electrical contacts.
1. Work on exposed energized systems greater than 600 volts is not permitted under this policy.
 2. A thorough inspection of all equipment shall be done to evaluate for potential hazards. Ensure the integrity of all enclosures and insulation.
 3. Live parts to which an employee may be exposed shall be de-energized by a qualified worker as specified in the **Lockout Tag Out Plan before the employee works on or near them unless a doing so creates a greater hazard.** The qualified worker shall test to ensure that the previously energized part is de-energized. Testing shall be done using a UL Category listed tester performing a live-dead-live test.
 4. If it is not feasible to de-energize exposed live parts, other safety-related work practices shall be used to protect the exposed employees. Only qualified personnel are allowed to work where exposed to energized equipment. Procedures utilized to perform this work shall include special precautionary techniques such as use of personal protective equipment, insulating and shielding material or insulated tools. An Energized Work Permit (Attached Form A) shall be completed before beginning this work.
 - Working on energized parts rated greater than 50 volts AC or DC shall only be performed by qualified personnel who have had specific training on the particular parts and equipment to be worked on.
 - The qualified employee's supervisor shall be contacted and an Energized Work Permit (Attached Form A) shall be completed before starting work on energized equipment with exceptions including testing, troubleshooting and inspections.
 5. No work on or near exposed live parts is permissible without proper illumination. (20-fc or greater)
 6. Employees working in confined or enclosed spaces shall de-energize or effectively barricade with protective shields or barriers any exposed live parts.
 7. Doors or hinged panel shall be secured to prevent swinging freely.
 8. Conductive materials and ladders shall be handled in such a manner that will prevent them from encroaching clearances as specified in Table 1. Only non-conductive ladders are allowed for use near energized parts.
 9. Conductive apparel (Jewelry) such as chains, watches or rings shall not be worn while working within the limited approach boundary.
 10. Interlocks shall not be bypassed unless a qualified person is temporarily working on equipment rated at less than 600 volts. For equipment rated at more than 600 volts, interlocks shall NEVER be bypassed.
 11. Unqualified personnel are restricted from access to exposed energized parts of voltages greater than 50 volts.
- c. Use of Portable Electric Equipment – Applies to cord and plug connected equipment.
1. This equipment shall be handled in a manner **which will not cause damage**. Avoid raising and lowering the equipment using flexible cords.
 2. Portable cord and plug equipment shall be inspected before use. If damage is detected it shall be removed from service. Extension cords shall periodically be given a continuity test along with the inspection to determine open points or short circuits (test for full continuity on each wire and zero continuity from wire to wire) by a qualified worker.

3. Grounded type tools or equipment shall have the grounded-type plug and shall be inspected to ensure compatibility with the receptacle. **Adapters or Cheaters that allow 3 wire grounded devices to be plugged into ungrounded outlets or receptacles are NOT permitted.** Ground Fault Circuit Interrupter (GFCI) devices shall be used for all cord and plug activities related to maintenance and while performing any work outside or in damp locations. Permanent GFCI installations are required for wet or damp locations such as vehicle maintenance shops. Devices may include GFCI receptacles, receptacles protected by GFCI breakers, or field operations - portable cord-connected GFCI.
- d. Power and Lighting Circuits – Includes the use of circuit breakers and fuses.
 1. Load rated circuit breakers shall be used for opening and closing circuits. Fuses, terminal lugs and cable splice connections shall not be used to make or break load.
 2. After a circuit has been de-energized by a circuit protective device, the circuit shall not be reenergized until it has been determined safe to do so by a qualified employee.
 3. Only qualified workers may perform testing work on electrical circuits. Test equipment shall be rated for the voltage to which they will be connected.
 4. Electrical equipment capable of igniting a spark shall not be used near flammable or ignitable material.
 5. A clear space of 3 feet and minimum of 30 inches wide (or the width of the equipment) is required in front of all electrical equipment which may be accessed.
 6. Flexible wire (i.e. SO type wire) shall not be used for permanent wiring. Flexible wire shall not be fastened to the facility structure unless fed by a bus duct switch.
- e. Safeguards for Personal Protection – Includes the use of personal protection equipment (PPE).
 1. Selected employees will be furnished with and shall use PPE at all times. The level of PPE used is determined by conducting a hazard assessment and choosing a level of protection that significantly reduces or eliminates the risk of injury related to the hazard.
 2. Conducting a job briefing and consulting the information in this program prior to performing any work will determine the hazards associated with the job. This process in conjunction with information on the Tables within this program will assist in determining the level of protection needed to work with or near electrical apparatus. See Table 2 to determine hazard risk classifications and PPE requirements. A simplified program is used as follows:
 - i. If the task is identified by a hazard risk category of 1 or 2, the qualified employee shall wear HRC 2 protect equipment.
 - ii. If the task is identified by a hazard risk category of 3 or 4, the qualified employee shall wear HRC 4 protective equipment.
- f. Personal protective equipment shall be used to protect from electrical hazards that have not been eliminated by de-energizing or guarding.
 1. Eye Protection – Plastic rimmed safety glasses with side shields meeting Z87 standards shall be used at all times while working on or near exposed live parts (HRC 0-4).
 2. Face Protection – A tinted arc shield shall be worn when working where there is a danger of flying objects from an electrical arc. Safety glasses shall be worn in conjunction with the shield. A full AR balaclava style hood shall be used in conjunction with the shield unless the arc flash study indicates the hazard level at 18” is less than 4 cal/cm². For higher incident energy levels (greater than 8 cal/cm² or HRC 3 or 4 shall wear a bee-keeper style hood. Care should be taken to limit the time wearing hoods to avoid oxygen deficiency unless air is mechanically supplied. (Hazard Rating 1-4)
 3. Head Protection – Non-conductive class E or G hard hats shall be worn where employees are exposed to electrical conductors that could contact the head. (Hazard Rating 1-4)

4. Hearing Protection – Arc rated hearing protection is required for all electrical switching of devices or where exposed to energized electrical parts rated greater than 50 volts. (Hazard Rating 0-4)
5. Insulated Equipment
 - i. Rubber gloves rated for the voltage shall be worn when avoiding contact with voltages over 50 volts or for any work on voltages over 250 volts where restricted approach boundaries (OSHA minimum approach boundary) are encroached.
 - a.) Rubber gloves shall be air tested before each days use and dielectrically tested every 6 months.
 - b.) Class 0 rubber gloves may be used on voltages up to 750 volts.
 - c.) Class 2 rubber gloves are required for voltages greater than 750 volts but less than 15,000 volts, however direct contact with energized parts using rubber gloves with voltages exceeding 750 volts from a ground position is prohibited. (Hazard Rating 1-4)
 - ii. Insulated barricades approved for use on energized equipment may be used to isolate the employee from the energized parts in lieu of using rubber gloves to avoid contact on lower voltages. Rubber gloves shall be used to install the barrier material.
 - iii. When exposed to voltages greater than 150 volts to ground, insulated mats shall be placed on the floor surrounding a generator. (Hazard Rating 1-4)
6. Clothing – Only natural fiber clothing (cotton or wool) shall be used at a minimum while working near exposed live parts including undergarments. In addition, if conditions dictate that a significant flash may result, Arc Rated (AR) clothing may be required. (See Table 2 for HRC levels and Table 3 for calorie/cm² ratings). Table 3 represents a simplified program.
 - The outer layer of clothing shall have an ATPV (Arc Thermal Performance Value) or Ebt (Electrical Breakthrough) rated for the arc flash hazard at the working distance. This includes rain gear or chemical suits.
7. Foot Protection – Safety-toe boots shall be utilized as needed. Electrical-rated boots may be used to provide additional resistance for protection of the worker. Extreme care shall be maintained in the immediate area where hazardous step and touch potential or voltage gradients on the earth may be present. Short heel-to-toe steps will minimize gradient potential.
- g. Additional Safety Requirements – Includes the use of signs and barriers.
 1. Safety symbols or signs shall be prominently displayed to warn employees and public about electrical hazards. This may include warning signs on panel doors, doors to electrical rooms or any hazardous location which may endanger employees. If signs are not in place on equipment and voltage is unknown, covers or doors shall not be opened until these voltages are determined.
 2. Protective shields, protective barriers, or insulating material shall be used to protect employees from shock, burns or electrically related injuries while the employee is working near exposed energized live parts. Conductive barricades shall not be used.
 3. Barriers i.e. “Danger Tape” shall be used to prevent non-qualified workers from entering the limited approach boundary outlined in Table 1.
 4. Reaching into an electrical cabinet without eyes on the hand at all times is prohibited. No blind reaching.

VII. Compliance

All electrical work shall be done to N.E.C. (National Electrical Code) standards and in compliance with OSHA regulations. Electrical work will be performed by qualified personnel only. On-site training will be conducted by qualified personnel.

- a. Conscientious observance of electrical safety procedures is expected of all qualified and nonqualified personnel; neglect of such responsibilities may subject the individual to serious injury. Failure to follow these procedures may result in disciplinary action.

VIII. References

- a. Occupational Safety & Health Act (OSHA) Regulations 29 CAR 1910.269, Subpart S
- b. National Fire Protection Association (NFPA) Standard 70E
- c. City/Local Building Codes

Attachment 1

Electrical Safety at Tufts University

Correct Use of “Power Strips” at Tufts University

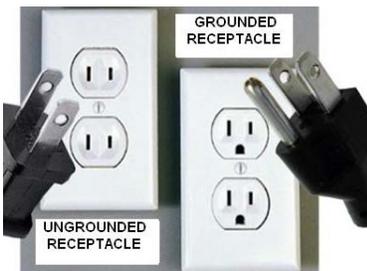
Power strips are multiple outlet extensions of a single branch circuit e.g. wall outlet used to increase the number of low power load devices such as computers, printers, lamps and other office appliances.

Rules for use

Check to make sure that the power strip is UL Underwriters laboratory or other equivalent safety standard listing ex: NRTL. To find, look for UL® label on the device not on the cord and plug!



Power strips have a total amp limit of 15 to 20 amps for all connected devices. Check that the power strip contains an overcurrent protection device that will disconnect the circuit if the amps delivered exceeds the rated limit.



Make sure that the power strip has a three pin grounded plug and that all outlets on the power strip have grounded outlets.

Do not use an adapter or “cheater” to plug a power strip into a two prong outlet-this cheats or eliminates the grounding which is critical.

Do not plug microwave ovens, toaster ovens, heaters, refrigerators, dehumidifiers, air conditioners or any other device that uses more than 10 amps current into a power strip.



If the circuit breaker trips, disconnect devices to reduce current load on the power strip before resetting the circuit breaker.

- Use in indoor locations only.
- Do not plug power strips into extension cords.
- Do not plug extension cords into power strips.
- Do not plug power strips into power strips (no” daisy chains”)
- Power strips do not substitute for fixed wiring and additional duplex outlets.
- Plug the power strip directly into permanently installed receptacle (wall outlet)
- No more than one power strip per outlet.
- Do not run the power strip cord through walls, windows, ceilings or floors.
- Power strips must not be used in damp locations such as laboratories, cold rooms, kitchens, laundries unless they are equipped with GFCI protection.

Attachment 2

Extension and Power Strip Safety-No electrical shocks, burns or fires at Tufts!

IN CASE YOU HAVEN'T 'HERD' ABOUT

PAGE 3

Extension and Power Strip Safety-No electrical shocks, burns or fires at Tufts!

Extension cord, power strip, power tap, multi tap or surge protector devices provide an important method of bringing temporary power to electrical devices that need to be used in areas not located near a wall outlet. UL approved and correctly sized extension cords are only allowable in the workplace as temporary wiring not to exceed 90 days. The U.S. Consumer Product Safety Commission (CPSC) estimates that each year, about 4,000 injuries associated with electric extension cords are treated in hospital emergency rooms. About half the injuries involve fractures, lacerations, contusions, or sprains from people tripping over extension cords. In addition, CPSC also estimates that about 3,300 residential fires each year, killing 50 people and injuring about 270 others. The most frequent causes of electrical fires are short circuits, overloading, damage, and/or misuse of extension cords, power strips, power taps and surge protectors.

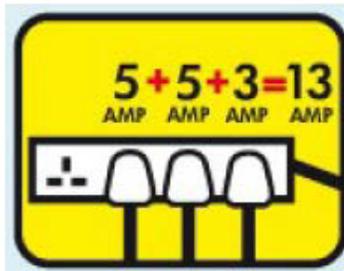
The most common cause of fires from extension cord, power strip, power tap or surge protector is primarily due to improper use and overloading, especially when cords have multiple outlets such as power strip and surge protectors. Recently, two Manhattan fires that occurred within two days, leaving one person dead and another seriously burned as a result of overloaded power strips. Cords and strips get hot enough "glowing red" to ignite cloth, paper, carpet etc. and start fires.

Most light duty extension cords are only rated for a maximum of ten amps or 1200 watts and most multitap (strip cord / power strip and surge protectors) are rated at 15 amps (1875 watts). Overloading can occur when multiple devices are plugged into one cord or when cords are "daisy chained" (plugging multiple extension cords together) or when the connected equipment is drawing more amps than the power strip is rated to handle.

The use of unapproved extension cords is a violation of both OSHA and National Fire Protection Association codes. The OSHA Code of Federal Regulations (29CFR1910.303 (a)) states that conductors and equipment are acceptable for use only if they are approved by recognized laboratories (such as Underwriters Laboratory, Factory Mutual, etc.). Approved extension cords are only allowable in the workplace as temporary wiring, and for no more than 90 days. Beware of cheap devices, they often do not meet safety standards and are illegally labelled.

Add it up!

If your device, equipment, instrument or tool that it uses eight amps at 125 volts, then its wattage rating will be 1000W ($8A \times 125V = 1,000W$). Additionally, if you are going to use an extension cord or a power strip or surge protector with two or more connected devices, you must add together the total wattage ratings for all used on the cord even if the other device is idle or not in full operation (has the potential of turning on to full load). Do not use a cord that has a lower rating than the equipment to be plugged in – check all manufacture's labels.



Let's look at a typical office equipment power strip, power tap or surge protector rating and see how quickly it adds up: NOTE: The total should not exceed the rated capacity of the extension cord, power strip, power tap or surge protector you are using, also assume full load of the equipment; a printer example. There is an idle listing and a printing amperage – assume the printing amperage. The following is a good use of a power strip



*PLEASE DISPLAY ON COMMUNITY BOARDS OR SHARE WITH ANYONE WHO WOULD BE INTERESTED

200 HARRISON AVENUE, BOSTON, MA 02111 | TEL 617.636.615 | FAX 617.636.2419 | public.safety@tufts.edu/ehs



Computer	2.0 amps	250 watts
LCD Monitor	1.5 amps	190 watts
Speakers	0.12 amps	15 watts
Desk lamp	0.32 amps	40 watts
Scanner	1.2 amps	150 watts
<u>Printer (Printing)</u>	<u>9.4 amps</u>	<u>1,175 watts</u>
Total	14.54amps	1,820 watts

Never use extensions or power strips for space heaters, refrigerators, microwave ovens, toaster ovens.

- Don't use extension cords as substitutes for permanent wiring- temporary use only.
- Purchase cords approved by an independent testing laboratory, such as Underwriters Laboratories (UL), MET, ETL or Canadian Standards Association (CSA).
- Never use a cord that feels hot or is damaged in any way. Touching even a single exposed strand can give you an electric shock or burn.
- Replace cords with cracks, cuts and damaged insulation. Typically, repair is not cost effective and can only be done by a qualified electrician.
- Power cords should never be nailed, stapled, or taped to the desk, wall, ceiling, baseboard, or another object.
- When unplugging a cord, pull on the plug, not the cord (yes, bend over)
- Unplug extension cords when not in use.
- Do not run extension cords through walls, doorways, under carpets, ceilings or floors. If cord is covered, heat cannot escape, which may result in a fire hazard.
- Don't coil equipment or extension cords while they're in use. Uncoil extension cords before use so that heat can escape.
- Avoid using extension cords when possible. If you must use an extension cord, select one that is rated for the full load amps of the connected equipment or tool. If more than one device is being connected to an extension cord, add the individual amp ratings of the devices together and confirm that it does not exceed the amp rating of the cord.
- Use a three-wire extension cord only. Do not use "cheaters" or 2-wire adaptors to connect to two prong outlets. This defeats the purpose of a three-prong plug and could lead to an electrical shock. Never force a plug into an outlet if it doesn't fit.
- Use exterior rated cords outside use (see label). Do not use indoor extension cords outdoors.
- GFCIs or GFCI pig tail is required for outdoor extension cord use.
- Do not extend extension cords by plugging into another. Overloading can occur when multiple devices are plugged into one cord or when cords are "daisy chained".



Never use extensions or power strips for space heaters, refrigerators, microwave ovens, toaster ovens

References

National Fire Protection Association <http://www.nfpa.org>
 Consumer Product Safety Commission, Extension Cords Fact Sheet <http://www.cpsc.gov/cpscpub/pubs/16.html>
 Consumer Product Safety Commission, Safety Tips <http://www.cpsc.gov/tips.html>
 Electrical Safety Foundation International, Indoor Electrical Safety Check <http://www.esfi.org/esfilib/indoorsafety.pdf>
 ISHN <http://www.ishn.com/articles/99614-two-nyc-fires-in-two-days-caused-by-overloaded-power-strings>