

Purpose

To provide general safety guidelines and procedures for electrical safety. This program will cover the following topics: general electrical safety, lockout/tagout procedures, and high-voltage procedures.

Program

DEFINITIONS:

1. Circuit Breaker: A device that automatically interrupts the flow of an electrical current.
2. Breaker Box: An insulated box on which interconnected circuits are mounted.
3. Electrical Panel: An insulated panel on which electrical wires are mounted.
4. Ground-Fault Circuit Interrupter (GFCI): A GFCI detects grounding problems and "shuts electricity off."
5. High Voltage: The term high voltage applies to electrical equipment that operates at more than 600 Bolts (for terminal to terminal operation) or more than 300 Bolts (for terminal to ground operation). Low voltage, high current AC or DC power supplies are also considered to be high voltage.
6. Hazardous Energy Sources: This term applies to stored or residual energy such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure.
7. Lockout: The placement of a lock on an energy-isolating device. This act prevents workers from operating a piece of equipment until the lock is removed.
8. Tagout: The placement of a tag on an energy-isolating device. A tagout device is a prominent warning device of a lockout.
9. Energy-Isolating Device: A mechanical device that prevents the transmission or release of energy. Examples include manually operated circuit breakers, disconnect switches, line or block valves. Pushbuttons, selector switches, and other control circuit devices do not isolate energy. Energy-isolating devices should be lockable by means of a hasp or other type of attachment. It should not be necessary to dismantle or reassemble a device to lock it.



ELECTRICAL GROUNDING:

Proper electrical grounding can help prevent electrical injury. Most electrical equipment is grounded with either a three-prong plug or a two-prong plug and insulation. Never remove the grounding plug from any electrical cord! This creates a potentially dangerous situation. Because a grounding system may be

defective without your knowledge, use a GFCI to ensure electrical safety. GFCI's are required in moist or potentially damp environments.

ELECTRICAL PANELS:

Electrical panels or breaker boxes require special safety considerations including the following:

- Know where your panel box is located.
- Do not touch the circuit breakers unless authorized to do so by Physical Plant.
- Ensure that panel box doors are securely attached.
- Do not block access to panel boxes. There should be at least 30 inches of clear space in front of a panel box.

Report tripped breakers to Physical Plant and refer any electrical questions to Physical Plant.

ELECTRICAL SAFETY GUIDELINES:

Be familiar with the electrical hazards associated with your work place. Unplug electrical equipment before repairing or servicing it.

- If a prong breaks off inside an outlet, do **not** attempt to remove it yourself. Call the Physical Plant for assistance.
- Ensure that outlets are firmly mounted. Report loose outlets to the Physical Plant.
- Report all electrical problems, including tripped breakers, broken switches, and flickering lights to the Physical Plant.
- All appliances used in West Chester University buildings must be UL or FM (factory manual) labeled.
- Do not use an appliance that sparks, smokes, or becomes excessively hot, unless the appliance is specifically designed to exhibit these characteristics.
- Portable electrical heaters must be placed to avoid causing a trip hazard and must be kept away from combustible material. Never leave a heater unattended. Unplug the heater at the end of the day and when not in use. **Ceramic Heaters are the preferred style of heater.**
- Keep electrical equipment away from water, unless the appliance is specifically designed for use around water, such as a wet-dry shop vacuum.
- Use GFCI's whenever possible.
- Be aware of overhead power lines when working with tall equipment (e.g., cranes, backhoes, etc.).
- Follow lockout/tagout procedures, as appropriate.

Follow these guidelines for electrical plug and cord safety:

- Do not remove the prongs of an electrical plug. If plug prongs are missing, loose, or bent, replace the entire plug.
- Do not use an adapter or extension cord to defeat a standard grounding device. (For example: only place three-prong plugs in three-prong outlets; do not alter them to fit into a two-prong outlet.)
- Use extension cords only when necessary and only on a temporary basis. Do not use extension cords in place of permanent wiring. Request new outlets if your work requires equipment in an area without an outlet.
- Use extension cords that are the correct size or rating for the equipment in use. The diameter of the extension cord should be the same or greater than the cord of the equipment in use.
- Do not run electrical cords above ceiling tiles or through walls.
- Keep electrical cords away from areas where they may be pinched and areas where they may pose a tripping or fire hazard (e.g., doorways, walkways, under carpet, etc.).
- Avoid plugging more than one appliance in each outlet. If multiple appliances are necessary, use an approved power strip with surge protector and circuit breaker. Do not overload the circuit breaker.
- Discard damaged cords, cords that become hot, or cords with exposed wiring.
- Never unplug an appliance by pulling on the cord; pull on the plug.

ELECTRICAL EMERGENCY RESPONSE:

1. **Electric Shock.** When someone suffers serious electrical shock, he or she may be knocked unconscious. If the victim is still in contact with the electrical current, immediately turn off the electrical power source. If you cannot disconnect the power source- **do not touch** the victim and immediately call 911 for assistance.

IMPORTANT: Do not touch a victim that is still in contact with a power source; you could electrocute yourself. Have someone call for emergency medical assistance immediately.

2. **Electrical Fire.** If an electrical fire occurs, try to disconnect the electrical power source, if possible. If the fire is small, you are not in immediate danger, and if you have been trained in fighting fires, use any type of fire extinguisher except water to extinguish the fire.

IMPORTANT: Do not use water on an electrical fire.

3. **Power Lines.** Stay away from live power lines and downed power lines. Be particularly careful if a live power line is touching a body of water. The water could conduct electricity.

4. If a power line falls on your car while you are inside, remain in the vehicle until help arrives or it is no longer safe to remain inside. When exiting such a situation, **jump** from the vehicle, and **shuffle** away (**DO NOT WALK**) from the vehicle until you are safely away. Remember that the ground can be energized around the vehicle and **to walk away could cause your death.**

LOCKOUT/TAGOUT PROCEDURES:

Lockout/tagout procedures are used to isolate hazardous energy sources from electrical, hydraulic, or pneumatic machinery. Furthermore, when service or maintenance work is required, lockout and tagout devices help ensure personal safety from possible energy releases. All employees whose work involves hazardous energy sources must be trained in lockout/tagout procedures.

Before performing service or maintenance work on machines, turn them off and disconnect them from their energy sources. To further ensure employee safety, "lockout" using energy-isolating devices and "tagout" to notify others in the area.

The following section provides information on lockout/tagout procedures. Only authorized employees may apply lockout/tagout devices. The following steps provide a brief outline of approved application procedures.

- Notify employees that the equipment requires service or maintenance and is scheduled for shutdown and lockout/tagout.
- Use established procedures to identify the type, magnitude, and hazards of the equipment's energy source. Make sure you know the proper methods for controlling the energy source.
- If the equipment is currently operating, shut it down using normal shutdown procedures.
- Isolate the equipment from its energy source by activating the energy-isolating device(s). Either lockout or tagout the energy-isolating device(s).
- Dissipate or restrain stored and residual energy using methods such as grounding, repositioning, blocking, bleeding, etc. (Capacitors, springs, hydraulic systems, and air/gas/water pressure system may contain stored or residual energy.)
- Ensure that all employees are removed from the equipment. Then, test the equipment for successful isolation by attempting to operate it.

IMPORTANT: After verifying isolation, return the controls to neutral or off.

REMOVING LOCKOUT/TAGOUT DEVICES:

When service and maintenance are completed, authorized employees may remove lockout/tagout devices and return equipment to normal operations. The following steps provide a brief outline of approved removal procedures.

1. Inspect the work area and remove any nonessential items. Make sure the isolation equipment is intact and in good working condition.
2. Ensure that all employees are safely removed from the equipment.
3. Verify that the equipment controls are in neutral or off.
4. Remove the lockout/tagout devices and re-energize the equipment.
5. Notify employees that the equipment is ready for operation.

HIGH VOLTAGE PROCEDURES:

In addition to the guidelines associated with general electrical safety and lockout-tagout procedures, there are more stringent safety requirements for high voltage procedures.

It is expected that only West Chester University personnel that are experienced in high voltage work will perform such operations. In the event that no such person is available, outside qualified personnel (i.e. the local electric company, qualified electricians, etc.) will be contracted for the job.