

SUBJECT: Electrical Safety

REGULATORY STANDARD:

DATE: January 2000

Introduction:

We use electricity everyday and many times think nothing of electricity's potential to cause injury or death. Dangers from electricity include shock, burns, fire, explosion, and radiation damage. About one-half of all electrical accidents result in serious injury, and one in thirty results in a fatality. Many fatalities occur from contact with underground or overhead wires.

Electrical Shock

Electricity is one of the most commonly encountered hazards in any facility. Under normal conditions, the safety features of the electrical equipment afford protection from shock. Yet many people are injured or killed by electricity every year.

The effects of electrical current on the human body depend on the following:

- Circuit characteristics (amount of current, resistance, frequency, and voltage).
- The current's pathway through the body.
- How long the contact lasts.
- Condition of the person's skin (breaks in the skin or wet skin will lower the bodies resistance to the flow of electricity).

Electricity running through the brain or the chest cavity can have severe consequences. Even very low currents can cause the heart and lungs to stop functioning properly.

Amount of current in Milliamps (mA)	Response
0.5 – 3	Start to feel the energy, tingling sensation
3 – 10	Experience pain, muscle contractions
10 – 40	Grip paralysis threshold (cant let go of source)
30 – 75	Respiratory failure
100 – 200	Heart fibrillation
200 – 500	Heart clamps tight
Over 1,500	Tissue and organs burn

(The National Electrical Safety Foundation)

Emergency Procedures:

If someone is being shocked, follow these procedures:

1. Shut off the power immediately. The longer the person is in contact with the electricity, the more damage will be done.
2. Do not try to touch or approach the person until the power has been shut off, or you too will become a part of the circuit. Use a dry wood broom, leather belt, plastic rope, or something similar that is non-conductive such as wood or plastic to free the person from the energy source.
3. Call 911 immediately. An electrical shock victim must go to the hospital even if they claim they are not hurt. Internal damage cannot be seen; only a physician can determine if the victim has been injured or not.
4. If the victim is unconscious, check to see that they have a pulse and are breathing. Initiate CPR or mouth to mouth resuscitation if necessary and if you are trained to do so.
5. Keep the person lying down and keep them warm to prevent shock.
6. Do not move the victim unless they are in immediate danger. Moving the victim could aggravate internal injuries or paralyze them since severe muscle contractions caused by electricity have been known to break bones in the victim.

If the victim is on fire, follow these procedures:

1. If the person's clothing is on fire, roll the person on the ground to smother the flames.
2. Call 911 immediately.
3. Cool the burn with water or saline for a few minutes. Do not attempt to remove clothing that is stuck to a burn.
4. Remove constricting items from the victim such as shoes, belts, jewelry and tight collars. They could continue to burn or cut off circulation if the victim experiences swelling.
5. Check the victim's breathing and heartbeat. Begin mouth to mouth resuscitation or CPR if necessary and if you are trained.
6. Keep the person lying down and keep them warm to prevent shock.

Electrical Fires:

The most important thing to remember during any fire is to evacuate the building. Do not try to fight a fire unless:

- The fire department has been called.
- The fire is still in the beginning stage (has not spread beyond its point of origin).
- You have been trained in the proper use of fire fighting equipment.
- You have the proper type of fire extinguisher for the fire.
- You have more than one unobstructed exit from the building.
- The power source has been shut off for a class C (electrical) fire.

Overheating, sparking, and arcing from equipment can cause electrical fires. Electrical fires are classified as class C fires, and only extinguishers rated for class C fires should be used.

Extension Cords:

Extensions cords enable us to power devices that are located a long distance from a power source, but tend to be one of the most abused pieces of electrical equipment around. They are only to be used as temporary power sources, not as permanent wiring. The following is a list of extension cord safety tips:

- Extension cords are not to be used as a substitute for fixed wiring.
- Extension cords should not be run through holes in walls, ceilings or floors.
- Do not attach extension cords to buildings.
- Always protect extension cords from physical damage.
- Inspect extension cords before and after every use for cuts, cracks or any other damage.
- Do not try to repair a damaged extension cord; a few dollars saved is not worth the risk.
- Do not run extension cords through high traffic areas (tripping hazard).
- Use only extension cords with ground fault circuit interrupters (GFCI) around damp areas or outside work areas.
- Do not overload an extension cord. Overheating could result if the cord is not big enough for the tool or appliance it powers.
- Always use a three pronged (grounded) extension cord.
- Only use extension cords that have been tested and approved by an independent laboratory (Underwriters Laboratories, UL).

General Safety Considerations:

- Beware of and report to physical facilities any of the following electrical hazards:
 - q Flickering lights
 - q Warm switches or receptacles
 - q Burning odors
 - q Loose connections
 - q Frayed, cracked or broken wires
- When unplugging appliances or cords, pull them by the plug, not the cord.
- Do not carry electrical equipment by the cord; this can cause damage to the cord.
- Verify the location of buried lines before conducting any digging.
- Know where over-current devices are (circuit breakers and fuses) so they can be easily and quickly reached in case of emergency.
- Always use insulated hand tools when working around electricity.
- All power tools should be grounded and/or double insulated.
- Never force a plug into an outlet if it does not fit.
- Remove damaged electrical appliances from service. Label them “Damaged, do not use” until they can be repaired.
- Do not attempt to repair electrical equipment yourself unless you are an electrician.
- Always follow lock-out/tag-out procedures.