



Basic Electrical Safety

Working with electricity can be dangerous. Engineers, electricians, and other professionals work with electricity directly, including working on overhead lines, cable harnesses, and circuit assemblies. Others, such as office workers and laboratory personnel, may work with electricity indirectly and may also be exposed to electrical hazards.

Electricity has long been recognized as a serious workplace hazard. OSHA's electrical standards are designed to protect employees exposed to dangers such as electric shock, electrocution, fires, and explosions.

Basic Electrical Safety Issues

Extension Cords/Power Strips

- Extension cords should not be used in place of permanent wiring.
- Ensure that cords are in proper working condition (the outer insulation should not be cracked/broken; the ground pin needs to be intact). Discard unsafe extension cords.
- Only licensed electricians are authorized to replace plugs or splice cords.
- Extension cords need to be protected from motor vehicles, forklifts, pallet jacks, heavy pedestrian traffic, etc.
- Power strips should not be permanently mounted to a wall or any other structure, even if the power strip has specific mounting fittings.
- Power strips or extension cords should not be connected to each other. Doing this can overload the circuit creating a potential fire hazard.

Circuit Overload Protection Devices:

- These devices are designed to protect the wiring in a house/building and to prevent a potential fire.
- Fuses:** Open the circuit when too much current is flowing through the circuit. A small conductor inside the fuse heats up and melts when it reaches a specific temperature.
- Circuit Breakers:** As current increases in the circuit, an electromagnet inside the breaker generates increased magnetic force, eventually being great enough to pull the switch on the breaker from the “on” to the “off” position.

Ground Fault Circuit Interrupters

- GFCIs are designed to protect people from an electric shock.
- A GFCI works by detecting a current drop from the hot to the neutral wiring in a circuit (Detects the energy escaping from the circuit).



- GFCIs should be installed wherever a water source is present.
- You will commonly find GFCI plugs on hairdryers, wet vacs, etc.
- GFCIs can be at the breaker, the outlet, incorporated with the plug of the appliance/piece of equipment, or part of a short extension cord.

Other Common Electrical Safety Issues

- Discard any piece of equipment that gives you even the slightest shock. If the resistance through your body is lowered, i.e. standing in water or touching metal, even the slightest shock can be deadly.
- Never use electrical equipment in or around water.
- Junction boxes and electrical panels within 8' of the floor need to have proper covers in place to conceal all wiring.
- Hard wiring should not be exposed/accessible to non-electrical employees.

National Fire Protection Association - (NFPA) 70E Standard for Electrical Safety in the Workplace

- National Fire Prevention Association (NFPA) 70E requirements for safe work practices protect personnel by reducing exposure to major electrical hazards. Originally developed at OSHA's request.
- NFPA 70E helps companies and employees avoid workplace injuries and fatalities due to shock, electrocution, arc flash, and arc blast, and assists in complying with OSHA 1910 Subpart S and OSHA 1926 Subpart K.
- NFPA 70E addresses electrical safety-related work practices for employee workplaces that are necessary for the practical safeguarding of employees relative to the hazards associated with electrical energy during activities such as:
 - Installation, inspection, operation, maintenance, and demolition of electric conductors, electric equipment, signaling and communications conductors and equipment, and raceways.
 - This standard also includes safe work practices for employees performing other work activities that can expose them to electrical hazards as well as safe work practices.
- Electrical work should only be conducted by a qualified person. OSHA defines a qualified person as “one who has received training in and has demonstrated skills and knowledge in the construction and operation of electrical equipment and installations and the hazards involved.”