

ELECTRICAL SAFETY PROGRAM

Electricity exposes workers to burns, shock, electrocution, fires and explosions. When working with electrical circuits or power tools there is always a risk of electrical shock.

Managements Responsibilities:

- Train employees
- Provide PPE
- Comply with OSHA and other regulatory standards
- Correct electrical safety hazards

Employees Responsibilities:

- Report electrical hazards
- Obtain proper training regarding safe work practices
- Inspect equipment
- Care for PPE

Hazards:

Electrical hazards are associated with inadequate or damaged wiring, exposed electrical parts, wires with bad insulation, ungrounded electrical system and tools, overloaded circuits, damaged power tools and equipment, and power lines.

Protection measures include proper grounding, use of fuses and circuit breakers, use of GFCI's, and guarding live parts. Safety-related work practices include:

- Electricity can be dangerous in wet working conditions
- Keep working places and walkways clear of electrical cords
- Use barriers and guards to prevent injuries from exposed energized equipment or parts
- Use Lock out / Tag out, PPE, and post warnings
- Do not overload circuits

Safe use of tools:

- Inspect tools, and use the right tool
- Use double insulated tools, and according to manufacturer's recommendations
- Remove tools with frayed cords, missing ground prongs, cracked tool casings, etc.
- Place warning tag to all defective tools and do not use until corrected

Power tools safety tips:

- Power tools must have a three-wire cord plugged into a grounded receptacle
- They must be double insulated
- Use gloves and appropriate footwear
- Store tools in dry place; Do not use in wet/damp conditions
- Keep working areas well lit
- Ensure stable footing to avoid tripping
- Do not carry tool by cord; Do not yank cord
- Keep cords away from heat, oil, or sharp objects
- Disconnect when not in use and when changing accessories
- Remove damaged tools from service

Lockout/Tagout:

See the Lockout/Tagout Policy.

To properly ground tools:

- Ground power supply systems, electrical circuits and electrical equipment
- Frequently inspect electrical systems to ensure that the path to ground is continuous
- Don't remove ground prongs from tools or extension cords
- Ground exposed metal parts of equipment
- Extension cords can only be used in a properly grounded outlet:
 - A third wire in the cord (the ground wire)
 - A 3 prong plug with a grounding prong
 - Circuit wires and insulation

GFCI:

A fast acting circuit breaker that senses small imbalances in a circuit caused by loss of ground or fluctuations in the electrical current. It prevents shocks by turning off the electricity.

PPE:

PPE for electrical work includes electrical utility hard hat, non-conductive footwear, rubber insulating gloves and matting. Standing in water and wearing wet clothes increases risk of electrocution.

Power lines:

Stay 10 feet away from power lines.

Safety points for using cords and wires:

- Pull on plugs, not the cords, when unplugging
- Use only insulated wires that are 3-wire type
- Use only if connected to circuits equipped with fuses or breakers
- Cords not rated for the anticipated load must be taken out of service

When using electrical wires:

- Use 3 pronged plugs with correct connectors
- Use and test GFCI's
- Check switches and insulation
- Use extension cords only when necessary and ensure they are in acceptable condition and rated for the job

Avoid wet conditions:

A damaged tool may not be grounded correctly, allowing the housing of the tool to become energized. Improperly grounded switch plates and ceiling lights are especially hazardous in wet conditions. If you touch a live electrical component with an un-insulated hand tool you are more likely to receive a shock when standing in wet conditions.

Training must include:

- How to de-energize electrical equipment before inspecting and repairing
- Lockout/tagout procedures
- How to use PPE
- How to use cords, cables, and electric tools properly
- Safety related work practices according to their respective job assignments

NFPA 70E

An electric shock as little as 50VAC for 1 second can disrupt the heart's rhythm causing death.

A shock hazard analysis must determine:

- PPE necessary
- Voltage at which EE's will be exposed
- Approach boundary requirements

Arc flash hazards:

It's a short circuit through the air. A large amount of energy explodes outward creating pressure waves that can damage a person's hearing, a high-intensity flash that can damage eyesight, and a heated ball of gas that can burn a worker's body.

Energized Electrical Work Permit:

Energized work must be performed under a written permit.

An electrical safety interlock is an electrical or mechanical device that prevents equipment or a circuit from becoming energized. Electrical panel doors such as electrical disconnecting switches are usually equipped with interlock that prevents the switch handle from being turned ON when the enclosure door is open. Only a qualified person can bypass an electrical safety interlock, and then only temporarily while he is working on the equipment.

One of the most violated rules of electrical safety is the use of test instruments, equipment and their accessories on energized circuits for which the test instruments are not rated.

Portable electronic equipment must be safely and properly handled. Flexible cords attached to equipment must not be used to raise or lower equipment. Flexible cords may not be fastened in place with staples or hung in a way that could damage the outer insulation jacket. Flex cords used with equipment that requires grounding must be equipped with a grounding conductor.

Any attachment plug or receptacle must not be altered if the alteration causes the grounding conductor to be interrupted. Prongs of any attachment plug must not be altered to allow the grounding pole of the plug to be inserted into slots intended for current-carrying conductors. Adaptors that serve to interrupt the continuity of the grounding conductor must not be used.

Verifying an Electrically Safe Work Condition:

- Determine all possible sources of electrical supply.
- Open all disconnecting devices for each source of electrical supply.
- Visually verify that the disconnecting device is fully open in the disconnected position.
- Apply lockout/tagout device.
- Test for the presence or absence of voltage.
- Ground the phase conductors in cases of induced voltages or stored energy.

More detailed regulations can also be found on OSHA's website at www.osha.gov.