### **OSHA Electrical Safety – SDS Web Page (Individual Task)**

**Purpose:** This standard focuses on ensuring that **electrical equipment used in construction** is properly **maintained to prevent malfunctions**, which could lead to **electrical injuries, explosions, or fatalities**. While it’s specific to construction, its principles apply to many workplaces.

### **Key Requirements:**

1. **Explosion-Proofing:**
   * Equipment must be maintained to **minimize the risk of explosions** caused by electrical failures.
   * Components must be secured and properly sealed, especially in hazardous environments.
2. **Dust Proofing:**
   * Electrical systems must be **protected from dust**, which can lead to **short circuits, electrical arcs**, or even **combustions**.
   * This includes using dust-tight enclosures and regular cleaning.
3. **General Maintenance and Upkeep:**
   * Employers and workers must **routinely inspect equipment** for:  
     + Loose screws
     + Damaged gaskets
     + Cracks or signs of wear
   * Preventive maintenance ensures equipment remains safe and functional.
4. **Reporting and Repairs:**
   * **Immediate reporting** of any defect is required.
   * Once an issue is identified, **the equipment must be taken out of service** until repaired.
   * Only qualified personnel should handle repairs.

### **OSHA Electrical Safety Standard 1926.416(a)(3): Circuit Awareness and Safety**

This standard emphasizes the critical importance of knowing the **location and condition of electrical circuits** at all times. The most effective way to prevent electrical injuries or fatalities is to **disconnect power at the source**. Employers are responsible for:

* **Clearly labeling** all circuits with visible signage.
* **Alerting workers** before they enter areas where live circuits may be present.
* **Locating, identifying, and inspecting** circuits regularly to maintain safety.

### **8 Key Electrical Safety Tips for Workers**

Before handling electrical wiring or equipment, workers should be properly trained in **safe practices and hazard recognition**. These eight tips serve as a guide to reduce risks and prevent accidents.

#### **1. Start with a Plan**

Prepare a detailed job plan before starting any electrical work. During this planning stage, assess the environment and equipment to spot hazards. This step ensures that workers use the right **PPE (Personal Protective Equipment)** and know where to cut the power if needed.

#### **2. Wear Appropriate Gear**

Workers must always wear **rubber gloves, insulating sleeves, and safety glasses**. Fire-resistant clothing is recommended to reduce burn risk. During planning, evaluate if more PPE is needed. All **metal items** like jewelry and watches should be removed before work begins.

#### **3. Use the Buddy System**

Never work alone near electrical sources. Having a second person nearby ensures that help can be summoned quickly or **CPR can be administered** in an emergency. Both team members should be trained in **CPR and electrical safety procedures**.

#### **4. Follow the Lock Out/Tag Out (LOTO) Protocol**

The **LOTO procedure** helps make sure equipment is de-energized before maintenance begins. Here are the six steps:

1. **Inspect the Equipment** – Identify any new or missed hazards.
2. **Power Down the Circuit** – Shut off the electrical supply completely.
3. **Isolate the Equipment** – Disconnect all electrical sources.
4. **Apply Locks and Tags** – Lock switches in the “off” position and attach a tag with the worker’s name and contact info.
5. **Discharge Stored Energy** – Test and release any remaining power in the system.
6. **Verify the System is Safe** – Re-check all steps before starting work.

#### **5. Avoid Wet or Damp Conditions**

Water conducts electricity and creates a serious hazard. Workers should avoid damp areas or cover them with **non-conductive materials**, such as wooden boards, if drying isn’t possible.

#### **6. Use Ground Fault Circuit Interrupters (GFCIs)**

GFCIs help protect workers by **automatically shutting off power** if they detect an electrical imbalance, such as during a shock. They serve as a vital backup safety tool.

#### **7. Maintain Distance from Overhead Power Lines**

Keep a **minimum of 10 feet** between workers and overhead power lines, as recommended by OSHA. Awareness is key to avoiding accidental contact.

#### **8. Inspect Electrical Equipment**

Check all electrical cords, outlets, and plugs for **damage or wear**. Replace faulty equipment immediately. For example, plugs missing a ground prong or showing burn marks should not be used.

### **Electrical Safety Summary**

#### **How Electric Shock Happens**

Electricity flows in **closed circuits**. A **shock** occurs when the body becomes part of the circuit. This can happen by:

* Touching **both wires** of an electrical circuit.
* Touching **one wire** and **ground**.
* Touching a **metal object** in contact with a live wire.

**Injury severity depends on:**

* The **amount of current**.
* The **path** through the body.
* The **duration** of contact.

**Other influencing factors:**

* Frequency of the current.
* Heart cycle phase.
* General health of the person.

Even **low voltages** can be fatal due to longer contact time.

#### **In Case of Electrical Emergency**

* **Call 911** immediately.
* If safe, **turn off power** before touching the victim.
* If not, use a **non-conductive object** (like a dry board).
* If not breathing and you're CPR trained, **begin CPR immediately**.

#### **Common Electrical Hazards**

* **Jewellery** can conduct electricity. Remove it before working.
* **Damaged cords**, exposed wires, and **overloaded outlets**.
* Using **metal ladders** (use wood or fiberglass).
* Working in **wet/damp** conditions.
* **Improper use** of extension cords or power strips.
* **Unqualified personnel** performing electrical work.

#### **Prevention Guidelines**

* Only **qualified electrical technicians** should perform electrical repairs.
* All equipment must be **UL listed**.
* Inspect **tools, cords, PPE** before use.
* Use **insulated tools** and **GFCI protection**.
* **Tag out / lock out** circuits before repairs.
* Don’t **daisy-chain** power strips or cords.
* Ensure **extension cord thickness** matches device requirement.
* Maintain **3 ft clearance** around electrical panels.

#### **Power Strip & Cord Usage**

* Power strips must have **built-in circuit breakers**.
* Never connect a power strip to another (no daisy-chaining).
* **Use power strips for portable use**, not permanent wiring.
* Replace **frayed/damaged** cords immediately.
* Do not run cords through **doors, windows, or under rugs**.

#### **Working in Wet Environments**

* Use **GFCI-protected** outlets or circuit breakers.
* GFCI devices **shut off power in 1/40th of a second**.

#### **Circuit Protection Devices**

* **Fuses** melt when overloaded.
* **Circuit breakers** trip to stop unsafe flow.
* **GFCIs** protect people by detecting imbalance in current.

#### **Access and Signage Requirements**

* Mark rooms with **live electrical parts** to restrict unqualified access.
* Live parts operating at **50 volts or more** must be **guarded** by:  
  + Restricted rooms/vaults.
  + Physical barriers or elevation.

#### **Special Case: Electrophoresis Equipment**

* Involves **electrical, chemical, and radiological** hazards.
* Ensure **all hazards** are addressed prior to use.
* Use **shielded equipment**, PPE, and proper **training**.

### **Checklist for Electrical Safety**

* Remove jewellery
* Use proper PPE
* Inspect tools and cords
* Confirm GFCI usage
* Do not use wet hands or work in damp areas without protection
* Follow lock-out/tag-out protocols
* Avoid overloading circuits
* Maintain clean and dry workspace