



## LP 4.8

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**Policy Owner:**  
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**Policy Administrator:**  
VP for Finance &  
Administration

**Affected Parties:**  
Employees

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# Electrical Safety

**References:** OSHA 29 CFR 1910 Subpart S, 1910.302 - 1910.399, NFPA 70e, NEC 110.26

## 1 Purpose

This Electrical Safety Policy has been established to ensure a safe and healthful working environment for Lander University employees and to serve as a performance standard for all employees.

## 2 Scope

This policy addresses the safeguards and procedures that are required for exposure to electricity at Lander University job sites. The guidelines established in this policy are designed to help reduce employees' occupational exposure to the hazards of working with or near electricity.

## 3 Responsibilities

### 3.1 Safety and Regulatory Compliance Officer

The safety and regulatory compliance officer is responsible for:

- 3.1.1 Administering and maintaining compliance with this policy and related procedures related to an electrical safety program.
- 3.1.2 Working with managers and supervisors across the campus to ensure the policy is effectively implemented and enforced in their areas.

### 3.2 Managers/Supervisors

Managers and supervisors are responsible for:

- 3.2.1 Ensuring that only qualified employees and/or qualified contractors perform electrical repairs or installations.

3.2.2 Ensuring that all applicable electrical safety procedures associated with this policy are effectively implemented and enforced in their areas.

### 3.3 Employees

Employees are responsible for:

3.3.1 Using electrical equipment, tools, and appliances in a manner consistent with the procedures described in this policy.

3.3.2 Attending required training sessions when directed to do so.

3.3.3 Reporting unsafe conditions to their supervisor immediately.

## 4 Definitions

### 4.1 Affected Personnel

Personnel who normally use and work with electrical equipment, tools, and appliances, but who do not make repairs or perform lockout/tagout procedures.

### 4.2 Appliances

Electrical devices not normally associated with commercial or industrial equipment (e.g., air conditioners, computers, printers, copiers, coffee pots, microwave ovens, toasters, etc.)

### 4.3 Circuit Breaker

A device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined overcurrent without injury to itself when properly applied within its rating.

### 4.4 Disconnecting Means

A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

### 4.5 Disconnecting Switch

A mechanical switching device used for isolating a circuit or equipment from a source of power.

### 4.6 Double-Insulated Tool

A tool designed of non-conductive materials that does not require a grounded, three-wire plug.

#### 4.7 Ground

To be connected to earth or some conducting body that serves in place of the earth.

#### 4.8 Grounded Conductor

A conductor used to connect equipment or the grounded circuit of a wiring system to a grounding electrode or electrodes.

#### 4.9 Ground Fault Circuit Interrupter (GFCI)

A device whose function is to interrupt the electric circuit to the load when a fault current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

#### 4.10 Insulated

A conductor encased within material of composition and thickness that is recognized as electrical insulation.

#### 4.11 Premises Wiring

The interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all of its associated hardware, fittings, and wiring devices, both permanently and temporarily installed, which extends from the load end of the service drop, or load end of the service lateral conductors, to the outlet(s).

4.11.1 Such wiring does not include wiring internal to appliances, fixtures, motors, controllers, motor control centers, or similar equipment.

#### 4.12 Qualified Person

An individual who has been trained in the repair, construction, and operation of electrical equipment and the hazards involved.

#### 4.13 Unqualified Person

An individual who has not been trained or authorized to repair or perform maintenance functions on electrical equipment.

#### 4.14 Class I Locations

Locations in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

#### 4.14.1 Class I, Division 1 - A location:

- 4.14.1.1 In which hazardous concentrations of flammable gases or vapors may exist under normal operating conditions; or
- 4.14.1.2 In which hazardous concentrations of such gases or vapors may exist frequently because of repairs or maintenance operations or because of leakage; or
- 4.14.1.3 In which a breakdown or faulty operation of equipment or processes might release hazardous concentrations of flammable gases or vapors and might also cause simultaneous failure of electrical equipment.

#### 4.14.2 Class I, Division 2 - A location:

- 4.14.2.1 In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the hazardous liquid, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in the event of accidental rupture or breakdown of such containers or systems, or in of abnormal operation of equipment; or
- 4.14.2.2 In which hazardous concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and that might become hazardous through failure or abnormal operations of the ventilating equipment; or
- 4.14.2.3 That is adjacent to a Class 1, Division 1 location, and to which hazardous concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

#### 4.15 Class II locations

Class II locations are those that are hazardous because of the presence of combustible dust. Class II locations include the following:

##### 4.15.1 Class II, Division 1 - A location:

- 4.15.1.1 In which combustible dust is or may be in suspension in the air under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures; or
- 4.15.1.2 In which mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be

produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes, or

4.15.1.3 In which combustible dusts of an electrically conductive nature may be present.

4.15.1.4 This classification may include areas in which metal dusts and powders are produced or processed, and other similar locations that contain dust-producing machinery and equipment (except where the equipment is dust-tight or vented to the outside). These areas would have combustible dust in the air, under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures.

4.15.1.4.1 Combustible dusts that are electrically nonconductive include dusts produced in the handling and processing produce combustible dusts when processed or handled.

4.15.1.4.2 Dusts containing magnesium or aluminum are particularly hazardous and the use of extreme caution is necessary to avoid ignition and explosion.

4.15.2 Class II, Division 2 - A location:

4.15.2.1 In which combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus; or

4.15.2.2 In which dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment, and dust accumulations resulting therefrom may be ignitable by abnormal operation or failure of electrical equipment or other apparatuses.

4.15.2.3 This classification includes locations in which dangerous concentrations of suspended dust would not be likely but where dust accumulations might form on or in the vicinity of electric equipment. These areas may contain equipment from which appreciable quantities of dust would escape under abnormal operating conditions or be adjacent to a Class II Division 1 location, as described above, into which an explosive or ignitable concentration of dust may be put into suspension under abnormal operating conditions.

## 5 Safe Work Practices

## 5.1 Inspections

- 5.1.1 Electrical equipment, tools, and appliances shall be inspected prior to each use.
- 5.1.2 Faulty equipment, tools, or appliances shall be removed from service immediately and tagged "OUT OF SERVICE", dated, and signed by the employee applying the tag.

## 5.2 Repairs

- 5.2.1 Only qualified personnel who have been authorized by Lander University shall make repairs to supply cords on electrical tools and to extension cords.
- 5.2.2 Only licensed electricians shall make repairs to electrical equipment and wiring systems.
- 5.2.3 The supervisor obtaining the services of a certified electrician is responsible for verifying the electrician's credentials.
- 5.2.4 Employees shall not enter spaces containing exposed energized parts unless qualified and proper illumination exists to enable employees to work safely.
- 5.2.5 Employees shall not wear conductive apparel (e.g., rings, watches, jewelry, etc.) unless they are rendered non-conductive by covering, wrapping, or other insulating means while working on or near open energized equipment (e.g., batteries on trucks, forklifts, or other such equipment).

## 5.3 Temporary Power (Extension) Cords

- 5.3.1 Use only three-wire, grounded extension cords and cables that conform to a hard service rating of 14 amperes (amps) or higher and grounding of the tools or equipment being supplied.
- 5.3.2 Only commercial or industrial rated-grounded extension cords shall be used in shops and outdoors.
- 5.3.3 Cords for use other than indoor appliances shall have a rating of at least 14 amps.
- 5.3.4 Avoid the use of extension cords to supply power to permanently installed equipment in lieu of a rigid conduit.
- 5.3.5 Extension cords shall be considered as temporary task cords and shall be unplugged and removed when the temporary task has been completed.

- 5.3.6 Work lamps (e.g., drop lights) used to power electrical tools shall have a three-wire, grounded outlet, unless powering insulated tools.
- 5.3.7 Avoid adapters that allow three-wire, grounded prongs to be connected to two-wire non-grounded outlets.
- 5.3.8 Extension cords shall have a service rating for hard or extra-hard service and have S, AJ, ST, SO, SJO, SJT, STO, or SJTO printed on the cord.
- 5.3.9 Extension cords shall not be run through doorways; under mats or carpets; across walkways or aisles; concealed behind walls, ceilings, or floors; or run through holes in walls or anywhere where they can become a tripping hazard.
- 5.3.10 High current equipment or appliances shall be plugged directly into a wall outlet whenever possible.
- 5.3.11 All extension cords shall be inspected daily or before each use for breaks, plug condition and ground lugs, possible internal breaks, and any other damage.

- 5.3.11.1 If damage is found, the extension cord or electrical cord shall be removed from service and repaired or replaced.

#### 5.4 Outlets

Outlets connected to circuits with different voltages shall use a design such that the attachment plugs on the circuits are not interchangeable.

#### 5.5 Relocatable Power Taps (Multiple Outlet Boxes)

- 5.5.1 Multiple outlet boxes shall be plugged into a wall receptacle.
- 5.5.2 Avoid plugging multiple outlet boxes into other multiple outlet boxes.
- 5.5.3 Avoid plugging extension cords into multiple outlet boxes.
- 5.5.4 Avoid the use of multiple outlet boxes to provide power to high-current loads.

#### 5.6 Double-Insulated Tools

- 5.6.1 Double-insulated tools shall have an intact factory label indicating that the tool has been approved for use without a three-wire, grounded supply cord connection.

- 5.6.2 Avoid altering double-insulated tools in any way that would negate the factory rating.

## 5.7 Switches, Circuit Breakers, and Disconnects

- 5.7.1 All electrical equipment and tools shall have an on and off switch and shall not be turned on or off by plugging or unplugging the supply cord at the power outlet.
- 5.7.2 Circuit breaker panel boxes and disconnects shall be labeled with the voltage rating.
- 5.7.3 Each breaker within a breaker panel shall be labeled for the service it provides.
- 5.7.4 Disconnect switches providing power for individual equipment shall be labeled accordingly.

## 5.8 Ladders and Portable Ladders

- 5.8.1 Only approved, non-conductive ladders shall be used when working near or with electrical equipment, which includes changing light bulbs.
- 5.8.2 Ladders shall be constructed of either wood or fiberglass.
- 5.8.3 Portable ladders shall have non-conductive side rails.
- 5.8.4 Wood ladders shall only be painted with clear lacquer since other paints can hide defects.
- 5.8.5 When ladders are used, they shall be free from any moisture, oils, and/or greases.

## 5.9 Energized and Overhead High Voltage Power Lines and Equipment

- 5.9.1 When working under overhead lines, clearance distance shall be provided, or lines shall be deenergized and grounded. The lines shall be deenergized and grounded or other protective measures shall be provided before work is started.
- 5.9.2 A minimum clearance of at least 10 feet from high voltage lines shall be maintained when operating vehicular and mechanical equipment (e.g., forklifts, cranes, winch trucks, and other similar equipment).



5.9.3 Per 29 CFR 1910.333(c)(3)(i), the minimum approach distance for unqualified employees to energized high power voltages lines 50kV or below shall be 10 feet. The approach distance for unqualified employees for voltages over 50kV shall be 10 feet for 50kV, plus 4 inches for every additional 10kV.

5.9.4 Minimum approach distance for qualified employees shall be followed per 29 CFR 1910.333(c)(3)(ii) Qualified Persons – Table S-5 – Approach Distances for Qualified Employees – Alternating Current (below)

Voltage Range (phase to phase)	Minimum Approach Distance
300V and less	Avoid contact
Over 300V, not over 750V	1 ft. 0 in. (30.5 cm)
Over 750V, not over 2kV	1 ft. 6 in. (46 cm)
Over 2kV, not over 15kV	2 ft. 0 in. (61 cm)
Over 15kV, not over 37kV	3 ft. 0 in. (91 cm)
Over 37kV, not over 87.5kV	3 ft. 6 in. (107 cm)
Over 87.5kV, not over 121kV	4 ft. 0 in. (122 cm)
Over 121kV, not over 140kV	4 ft. 6 in. (137 cm)

#### 5.10 Confined or Enclosed Workspaces

5.10.1 When an employee works in a confined or enclosed space that contains exposed energized parts, the employee shall isolate the energy source and turn off the source and lock and tag out the energy source.

5.10.2 Only qualified electricians shall work on an exposed energy source.

5.10.3 Protective shields, protective barriers, or insulating materials shall be provided as necessary.

#### 5.11 Enclosures, Breaker Panels, and Distribution Rooms

5.11.1 A clear working space shall be maintained in the front, back, and on each side of all electrical enclosures and around electrical equipment for a safe operation and to permit access for maintenance and alteration.

- 5.11.2 A minimum 36-inch-wide working floor space in front of panels and enclosures shall be maintained free of materials.
- 5.11.3 Employees shall not enter spaces containing exposed energized parts unless illumination is provided that enables the employees to work safely.
- 5.11.4 Housekeeping in distribution rooms shall be a high priority to provide a safe working and walking area in front of panels and to keep combustible materials to the minimum required to perform maintenance operations.
- 5.11.5 All enclosures and distribution rooms with voltage at 600 VAC or greater shall have signage indicating “DANGER: HIGH VOLTAGE – AUTHORIZED PERSONNEL ONLY” posted on the front panel and on entrance doors.
- 5.11.6 Avoid the use of flammable materials inside distribution rooms.

## 5.12 Lockout/Tagout (LOTO)

No work shall be performed on live components and the hazards they present or near enough for employees to be exposed due to the dangers of tools or other equipment coming into contact with the energized components.

- 5.12.1 In the event that an employee is exposed to contact with parts of fixed electric equipment or circuits that have been de-energized, the circuits energizing the parts shall be locked out or tagged or both.
- 5.12.2 Conductors and parts of electrical equipment that have been de-energized but not locked or tagged out shall be treated as live parts.
- 5.12.3 Per Lander University policy, all electrical work with exposure >50 VAC shall be performed only by a qualified and licensed electrical person (employee or third party) who is familiar with the use of special precautionary techniques, PPE, insulating and shielding materials, and insulated tools.
- 5.12.4 Any equipment being made ready for maintenance shall be locked out in a manner consistent with the Lander University Lockout/Tagout Policy.
- 5.12.5 Only authorized personnel shall perform LOTO work on electrical equipment, and they shall follow the Lander University Lockout/Tagout Policy.
  - 5.12.5.1 Authorized personnel who perform LOTO work shall be trained in LOTO procedures.
  - 5.12.5.2 Affected personnel shall be notified when LOTO activities are being performed in their work area.

### 5.13 Fire Extinguishers

Approved fire extinguishers shall be provided near electrical breaker panels and distribution centers.

### 5.14 Electric Welders

5.14.1 A disconnecting means shall be provided in the supply circuit for each motor-generator arc welder, and for each AC transformer and DC rectifier arc welder that is not equipped with a disconnect mounted as an integral part of the welder.

5.14.2 A switch or circuit breaker shall be provided by which each resistance welder and its control equipment can be isolated from the supply circuit.

5.14.2.1 The ampere rating of this disconnecting means shall not be less than the supply conductor ampacity.

### 5.15 Equipment Grounding

5.15.1 Equipment bonding jumpers shall be of copper or another corrosion-resistant material.

5.15.2 The transfer of hazardous or flammable material from a metal or plastic container with a flash point of 100°F or less shall have a ground strap from the container and attached to the skid or a ground rod placed in the ground.

### 5.16 Assured Grounding

OSHA requires that employers shall use either ground fault circuit interrupters (GFCIs) or an assured equipment grounding conductor program to protect personnel from electrical shock while working.

### 5.17 Ground Fault Circuit Interrupters (GFCIs)

All 120-volt, single-phase 15 and 20 ampere receptacle outlets on construction or maintenance sites that are not part of the permanent wiring of the building or structure and that are in use by employees shall have approved GFCIs for personnel protection.

5.17.1 All hand portable electric tools and extension cords shall use a GFCI.

5.17.2 Approved GFCIs shall be used for 240-volt circuits in the same service as described above.

- 5.17.3 GFCIs shall be used on all 120-volt, single-phase 15-amp and 20-amp receptacles within six feet of a sink, of a damp area, or on installed outdoor equipment.
- 5.17.4 A GFCI shall be the first device plugged into a permanent receptacle.
- 5.17.5 A GFCI shall be tested before each use.

## 5.18 Safeguards For Employee Protection

- 5.18.1 At the entrances to all buildings, rooms, or enclosures containing exposed live parts or exposed conductors operating over 600 volts:
  - 5.18.1.1 The entrances shall be kept locked unless they are under the observation of a qualified person at all times; and
  - 5.18.1.2 Permanent and conspicuous warning signs shall be provided, reading as follows:
    - 5.18.1.2.1 “DANGER -- HIGH VOLTAGE -- KEEP OUT”, or
    - 5.18.1.2.2 “DANGER – HIGH VOLTAGE – AUTHORIZED EMPLOYEES ONLY”.
- 5.18.2 Employees working in areas in which where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.
  - 5.18.2.1 Equipment shall be maintained in a safe, reliable condition. Such protective equipment shall be periodically inspected and/or tested.
  - 5.18.2.2 Voltage-rated, rubber-insulating gloves shall be:
    - 5.18.2.2.1 Inspected prior to each use.
    - 5.18.2.2.2 Tested by a qualified lab at least every six months.
- 5.18.3 If the insulating capability of protective equipment may be subject to damage during use, the insulating material shall be protected (e.g., an outer covering of leather used for the protection of rubber insulating material).

- 5.18.4 Employees shall wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns resulting from contact with exposed energized parts.
- 5.18.5 Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.
- 5.18.6 Each employee shall use insulated tools or handling equipment if they might make contact with conductors or parts.
  - 5.18.6.1 If the insulating capability of insulated tools or handling equipment is subject to damage, then the insulating material shall be protected.
- 5.18.7 Ropes and handlines used near exposed energized parts shall be nonconductive.
- 5.18.8 Protective shields, protective barriers, or insulating materials shall be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts.
- 5.18.9 When normally enclosed live parts are exposed for maintenance or repair, they shall be guarded to protect unqualified persons from contact with the live parts.
- 5.18.10 Alerting techniques used to warn and protect employees from hazards that could cause injury resulting from electric shock, burns, or failure of electric equipment parts shall take the form of safety signs and tags, barricades, and attendants.

## 6 Training

### 6.1 Training Procedures

- 6.1.1 All affected, qualified, and unqualified employees shall be trained in electrical safety.
- 6.1.2 The training required by this program shall be of the classroom and/or on-the-job type. The degree of training provided shall be determined by the risk to the employee and the type of task.
- 6.1.3 The training requirements contained in this section shall apply to employees who face a risk of electric shock that is not reduced to a safe level (zero

energy state) by the electrical installation requirements referenced for the device or electrical system in place.

6.1.3.1 Employees who may be exposed to approach distances referenced in 5.9.4. of this policy shall be trained.

6.1.3.2 Other employees who also may reasonably be expected to face a comparable risk of injury due to electric shock or other electrical hazards shall also be trained.

## 6.2 Content of Training

### 6.2.1 Unqualified Employees

6.2.1.1 Employees shall be trained in and familiar with the safety-related work practices required that pertain to their respective job assignment.

6.2.1.2 Unqualified Persons who are covered by this program, but who are not qualified persons, shall also be trained in and become familiar with any electrically related safety practices not specifically addressed by their previous position-specific training.

### 6.2.2 Qualified Persons

6.2.2.1 Qualified persons (i.e., those permitted to work on or near exposed energized parts >50 VAC and/or >100 VDC) shall, at a minimum, be trained in and be familiar with the following:

6.2.2.1.1 The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.

6.2.2.1.2 The skills and techniques necessary to determine the nominal voltage of exposed live parts.

6.2.2.1.3 The clearance distances specified in section 5.9.4. of this policy and the corresponding voltages to which the qualified person will be exposed.

## 7 Appendix A: Electrical Safety Checklist

The following Electrical Safety Checklist shall be available for use as an optional tool as needed.

- Are only qualified persons allowed to work on electrical equipment (exposed >50 Volts AC or 100 Volts DC) *and* are they familiar with Lander University electrical safety rules?
- Are lockout/tagout procedures required when electrical equipment is being serviced?
- Are portable hand-held electrical tools and equipment grounded or double-insulated?
- Are electrical appliances (e.g., refrigerators, coffee pots, vacuum cleaners, polishers, vending machines) grounded?
- Do extension cords have a ground prong?
- Are ground-fault circuit interrupters that are not a part of the permanent wiring of the building installed on 125-volt, single phase, 15-, 20-, and 30-ampere receptacles?
  - If not, is there assured equipment grounding?
- Are damaged wiring or frayed cords promptly repaired or replaced?
  
- Electrical tools and equipment used in damp or wet areas approved for work in those locations?
- Are metal ladders not used in areas where there could be exposure to energized parts of equipment, fixtures, or circuit conductors?
- Are all disconnecting switches labeled to indicate their use or the equipment they serve?
- Are energized parts of electrical equipment operating at 50 volts or more enclosed in approved cabinets?
- Is there sufficient access and working space around all electrical equipment?
- Are all unused openings in breaker boxes appropriately plugged or covered?
- Is the use of each circuit breaker properly labeled?
- Do switches, receptacles, and junction boxes have tight-fitting covers or face plates?
- Are employees forbidden from working within 10 feet of high-voltage (over 600 volts) lines?

## 8 Policy Revision History

- First draft of policy submitted by the Vice President for Finance and Administration on 11/2/2023.
- Prepared for board review by policy coordinator on 11/9/2023.
- Reviewed by board of trustees Policy Committee on 11/16/2023.

- Policy Committee suggestions approved by Vice President for Finance and Administration on 11/24/2023.
- Final Draft for Policy Committee board report prepared by policy coordinator on 11/27/2023.
- Approved by the Lander University Board of Trustees on 12/12/2023.