

OSHA Electrical Safety Complete Pack

FORBES SAFETY SOLUTIONS

Complete bundle — 8 templates included

Editable Word/Excel/PowerPoint versions available at forbessafetysolutions.com/downloads/

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Company:		Location:
Inspector:		Date:

[illegible]

QUARTERLY COLOR CODE SYSTEM

Quarter	Color Code	Tape/Tag Color
Q1 (Jan-Mar)	WHITE	White electrical tape
Q2 (Apr-Jun)	GREEN	Green electrical tape
Q3 (Jul-Sep)	RED	Red electrical tape
Q4 (Oct-Dec)	ORANGE	Orange electrical tape

AEGCP requires testing before first use, after repairs, and at least every 3 months

Generated: 2026-03-16 | Forbes Safety Solutions

FORBES SAFETY SOLUTIONS
ELECTRICAL TOOL & CORD INSPECTION LOG

Reference: 29 CFR 1926.404-405 | Assured Equipment Grounding Conduc

[illegible]

Period
January 1 - March 31
April 1 - June 30
July 1 - September 30
October 1 - December 31

tor Program (AEGCP)

[illegible]

JOB HAZARD ANALYSIS

Electrical Rough-In — Commercial & Residential

Applicable Standards: 29 CFR 1926 Subpart K (1926.400–1926.449) — Electrical; NFPA 70E — Electrical Safety in the Workplace; 29 CFR 1926.405 — Wiring Methods; NEC Article 210–230

Project Name: _____	Date: _____
Location: _____	Supervisor: _____
Crew Members: _____	

Step #	Job Steps	Potential Hazards	Hazard Controls	Responsible Person
1	Review electrical drawings and conduct panel board layout / circuit identification	Errors from outdated drawings leading to incorrect installation; conflict with other trades; energized existing circuits in remodel work	Verify drawings are latest revision (RFI log current). Coordinate with GC and other trades on routing conflicts. Use non-contact voltage tester on ALL existing wiring before handling. Lock-out/tag-out (LOTO) per 1926.417 on any energized panel.	
2	Install electrical boxes (junction, device, and panel enclosures)	Struck-by from overhead work; cuts from sheet metal box edges; falls from ladders or scaffolds; dust/debris in eyes	Wear safety glasses and cut-resistant gloves. Inspect ladder before each use — three-point contact. Secure boxes per NEC mounting requirements. Hard hat in multi-trade work areas. Deburr box knockouts before pulling wire.	
3	Run conduit (EMT, rigid, or PVC) and support per NEC spacing requirements	Musculoskeletal injury from overhead conduit installation; struck-by from falling conduit; cuts from conduit reaming; silica dust from concrete penetrations	Use mechanical benders — no improvised bending methods. Two-person lift for runs >10 ft. Support per NEC 358.30 (EMT) intervals. Ream all cut ends to prevent wire insulation damage. Core drill with dust collection or wet method for concrete penetrations.	
4	Pull conductors through conduit and cable tray systems	Electrical shock from contact with existing energized conductors; hand/finger pinch or crush injuries at pull points; eye injury from wire snap-back	Confirm circuits de-energized — LOTO verified with voltage tester at point of work. Wear leather gloves at pull points. Safety glasses mandatory. Communication between puller and feeder (radios for long runs). Wire pulling lubricant to reduce tension.	
5	Make conductor terminations and splices in junction boxes	Electrocution from energized circuits; arc flash from improper connections; cuts from wire strippers; confined space in electrical rooms	Zero-energy verification at each termination point. Use insulated tools rated for voltage class. Proper wire nut or compression connector sizing — no electrical tape as primary splice method. Follow NEC box fill calculations (314.16).	
6	Install grounding electrode system and equipment bonding conductors	Electrocution during ground rod driving; struck-by from hammer/driver; inadequate grounding creating future shock hazard	De-energize all circuits during grounding work. Use ground rod driver — never strike rod directly with hammer. Verify ground resistance with fall-of-potential test (<25 ohms per NEC 250.53). Torque all bonding connections to manufacturer specs.	
7	Install temporary power distribution and GFCI protection	Electrical shock from improper temporary wiring; fire from overloaded circuits; tripping hazards from cords	All temporary power circuits protected by GFCI per 1926.405(a)(2)(ii). Assured equipment grounding conductor program as alternative. No daisy-chaining power strips. Protect cords from damage — elevate or use cord covers across walkways.	
8	Conduct insulation resistance testing (megger test) on completed circuits	Electric shock from test voltage (500V–1000V DC); damage to sensitive equipment; miswired circuits	Verify all circuits isolated before testing. Post warning signs at both ends during megger test. Only qualified electricians perform testing. Discharge conductors after testing.	

Step #	Job Steps	Potential Hazards	Hazard Controls	Responsible Person
			Document readings per circuit.	
9	Energize panels and perform circuit verification / labeling	Arc flash during initial energization; electrocution; burns from fault current; incorrect circuit identification	Energize with panel door closed — stand to the side (arc flash protection position). Wear appropriate PPE per NFPA 70E arc flash risk assessment (Category 2 minimum for 208V panels). Verify each circuit with receptacle tester. Label all breakers accurately.	

 **This JHA must be reviewed and signed by all crew members before work begins.** Conditions on the jobsite may change — reassess hazards throughout the shift and update this JHA as necessary.

REVIEW & APPROVAL

Reviewed By (Print Name)

Signature

Date

FORBES SAFETY SOLUTIONS

JOB HAZARD ANALYSIS

Energized Electrical Work

Regulatory References: NFPA 70E, 29 CFR 1910.331-335, 29 CFR 1926 Subpart K

Document No: FSS-JHA-037 | Revision: 0 | Date: _____

Project Name:		Date:	
Location:		JHA Number:	
Supervisor:		Permit Required:	☐ Yes ☐ No
Prepared By:		Reviewed By:	

JOB HAZARD ANALYSIS TABLE

Task Step	Hazard	Risk Level (H/M/L)	Control Measures
1. Energized Work Permit & Justification	Unnecessary exposure to electrical hazards Inadequate planning Failure to justify energized work	H H M	Complete Energized Electrical Work Permit (EEWP) per NFPA 70E Document justification: de-energizing creates greater hazard or is infeasible Obtain approval from qualified electrical safety supervisor Perform shock and arc flash risk assessments Brief all workers on specific hazards, boundaries, and emergency plan
2. Approach Boundary Establishment	Unauthorized personnel in danger zone Incorrect boundary distances Arc flash exposure	H H H	Determine Limited, Restricted, and Arc Flash boundaries per NFPA 70E Table 130.4(E)(a) Mark boundaries with barricades, tape, and warning signs Post arc flash labels with incident energy (cal/cm ²) on equipment Only qualified persons within Limited Approach Boundary Attendant posted to control access at boundary perimeter
3. Arc Flash PPE Donning	Inadequate PPE rating Improper donning Heat stress from PPE	H M M	Select PPE based on incident energy analysis (cal/cm ² rating) Inspect all PPE for damage, cleanliness, and proper rating before use Don arc-rated layers: base layer, coverall/flash suit, hood, gloves, boots Verify all gaps sealed: no exposed skin within arc flash boundary Monitor workers for heat stress; rotate personnel as needed

Task Step	Hazard	Risk Level (H/M/L)	Control Measures
4. Voltage Testing & Verification	Contact with energized parts Faulty test equipment Incorrect readings	H M H	Use voltage-rated test instruments rated for the voltage present Verify tester operation on known live source BEFORE and AFTER testing (Live-Dead-Live method) Maintain safe approach distances while testing Use insulated tools and one-hand technique Communicate readings clearly to all team members
5. Energized Work Execution	Arc flash (temps to 35,000°F) Arc blast (pressure wave) Electrical shock Burns Secondary blast-force injuries	H H H H H	Only qualified electrical workers perform energized tasks Work one phase/conductor at a time; insulate adjacent conductors Use insulated hand tools rated for voltage Position body to minimize exposure; turn face away from potential arc Maintain minimum approach distance per NFPA 70E Safety watch/attendant present with rescue equipment ready No loose clothing, jewelry, or conductive items
6. Re-establishment of Covers/Barriers	Accidental contact during closeout Unsecured covers Incomplete restoration	H M M	Replace all covers, guards, and barriers before removing PPE Verify all connections are secure and properly torqued Confirm no tools or materials left inside equipment Update arc flash labels if modifications were made Close out Energized Electrical Work Permit Document all work performed and any anomalies found

REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE)

☐ Arc-Rated Face Shield / Hood (cal/cm ² per hazard analysis)	☐ Arc-Rated Coveralls or Flash Suit
☐ Voltage-Rated Insulating Gloves with Leather Protectors	☐ Safety Glasses (ANSI Z87.1) under face shield
☐ Dielectric Safety Boots	☐ Hard Hat (ANSI Z89.1 Type I, Class E)
☐ Hearing Protection (arc blast noise)	☐ Arc-Rated Balaclava
☐ FR Underwear/Base Layers	☐ Voltage-Rated Insulating Blankets/Mats

EMERGENCY PROCEDURES

1. In case of arc flash event, evacuate all personnel from the immediate area. Call 911 immediately. Do NOT attempt to touch the victim until power is confirmed de-energized.
2. For electrical shock, de-energize the circuit from a safe location using insulated tools. Begin CPR/AED if victim is unresponsive. Do NOT move the victim unless in immediate danger.
3. For arc blast injuries (pressure wave), assess for internal injuries, hearing damage, and burns. Treat burns with sterile dressings; do NOT apply ointments or remove fused clothing.
4. If secondary fire occurs from arc flash, use Class C fire extinguisher (CO2 or dry chemical). Evacuate if fire cannot be controlled within 30 seconds.
5. All arc flash incidents require immediate notification to safety department, investigation, and incident report within 24 hours regardless of injury severity.
6. Ensure AED is staged within 2 minutes of the work area. Two qualified first aid/CPR responders must be present.

Emergency Contact:	911 / Site-specific: _____
Assembly Point:	
Nearest Hospital:	
First Aid Kit Location:	

WORKER SIGN-OFF

By signing below, I acknowledge that I have reviewed and understand this Job Hazard Analysis, the associated hazards, and the required control measures.

#	Print Name	Signature	Company	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

REVIEW & APPROVAL

This JHA has been reviewed and approved by the following authorized personnel:

Role	Name / Signature	Date
Prepared By (Safety Professional)		
Reviewed By (Site Supervisor)		
Approved By (Project Manager)		
Client Representative (if required)		

Next Review Date:	
Revision Notes:	

FORBES SAFETY SOLUTIONS | *Committed to Zero Incidents*

This document is valid only when all sections are completed and signatures obtained.

FORBES SAFETY SOLUTIONS

ELECTRICAL SAFETY PROGRAM

OSHA-Compliant Workplace Safety Program

[COMPANY NAME]

Effective Date: [DATE]

Revision Number: [REV #]

Prepared By: [NAME / TITLE]

Approved By: [NAME / TITLE]

Approval Date: [DATE]

TABLE OF CONTENTS

1. PURPOSE & SCOPE

The purpose of this Electrical Safety Program is to establish minimum requirements and procedures for protecting [COMPANY NAME] employees from electrical hazards encountered during work activities. This program applies to all employees, contractors, and visitors who may be exposed to electrical hazards at [COMPANY NAME] job sites and facilities.

This program addresses both general industry and construction electrical safety requirements, ensuring compliance with applicable OSHA standards and recognized industry best practices.

Scope of Application:

- All work performed on or near energized electrical equipment or conductors
- Installation, maintenance, and repair of electrical systems
- Use of portable electrical equipment and extension cords
- Work performed near overhead and underground power lines
- Arc flash hazard assessment and mitigation

2. REGULATORY REFERENCES

This program is designed to comply with the following regulatory standards:

- **29 CFR 1910.331–335** — OSHA General Industry: Electrical Safety-Related Work Practices
- **29 CFR 1910.301–308** — OSHA General Industry: Electrical Design Safety Standards
- **29 CFR 1926 Subpart K (§1926.400–449)** — OSHA Construction: Electrical
- **NFPA 70E** — Standard for Electrical Safety in the Workplace (current edition)
- **NFPA 70** — National Electrical Code (NEC)
- **ASTM F1506** — Standard Performance Specification for FR Textile Materials for Wearing Apparel
- **IEEE 1584** — Guide for Performing Arc Flash Hazard Calculations

3. DEFINITIONS

3.1 Qualified Person

An individual who has training and demonstrated skills and knowledge in the construction and operation of electrical equipment and installations, and has received safety training to identify and avoid the

hazards involved. A Qualified Person must be able to distinguish exposed live parts, determine nominal voltage, and know the clearance distances required per NFPA 70E.

3.2 Unqualified Person

An individual with little or no training regarding electrical hazards. Unqualified persons must be trained in and familiar with any electrically related safety practices necessary for their safety. Unqualified persons shall not approach energized parts closer than the Limited Approach Boundary without the guidance of a Qualified Person.

3.3 Approach Boundaries

NFPA 70E defines the following shock protection approach boundaries for AC systems:

- **Limited Approach Boundary** — The distance from an exposed energized conductor within which a shock hazard exists. Unqualified persons may not cross this boundary.
- **Restricted Approach Boundary** — The distance from an exposed energized conductor within which there is an increased likelihood of electric shock. Only Qualified Persons wearing appropriate PPE may cross this boundary.
- **Prohibited Approach Boundary** — The distance from an exposed energized conductor within which work is considered the same as making contact with the conductor. Crossing this boundary requires the same PPE and procedures as direct contact.
- **Arc Flash Boundary** — The distance from an arc source at which incident energy equals 1.2 cal/cm² (the threshold for a second-degree burn).

4. ROLES & RESPONSIBILITIES

4.1 Management / Employer

- Provide adequate resources for implementation and maintenance of this program
- Ensure an arc flash hazard analysis is performed and labels are applied to equipment
- Provide appropriate PPE and ensure it is maintained in safe, reliable condition
- Ensure only Qualified Persons perform work on energized electrical equipment
- Maintain and make available all required safety documentation and permits

4.2 Safety Manager

- Administer this Electrical Safety Program and ensure compliance

- Conduct periodic audits of electrical safety practices (at least annually)
- Review and approve all Energized Electrical Work Permits
- Investigate all electrical incidents and near-misses
- Coordinate training programs for Qualified and Unqualified Persons

4.3 Qualified Persons / Employees

- Follow all established electrical safety work practices and procedures
- Inspect tools, equipment, and PPE before each use
- Report unsafe conditions, damaged equipment, and near-misses immediately
- Maintain current training qualifications
- Participate in all required safety training

5. PROGRAM PROCEDURES

5.1 Energized Electrical Work Permit

All work on energized electrical conductors or circuit parts operating at 50 volts or more shall be de-energized before work begins, unless one of the following conditions applies:

- De-energization introduces additional or increased hazards (e.g., loss of ventilation in a hazardous location, deactivation of emergency systems)
- De-energization is infeasible due to equipment design or operational limitations

When energized work is justified, an **Energized Electrical Work Permit** (see Appendix A) must be completed and approved by the Safety Manager before work begins. The permit must document:

- Description and location of the circuit/equipment
- Justification for why the work must be performed energized
- Shock and arc flash hazard analysis results
- Safe work practices to be employed
- Required PPE for each task
- Means of restricting access to the work area
- Evidence of job briefing completion

5.2 De-Energization (Lockout/Tagout) Procedures

The following steps shall be followed for de-energizing electrical equipment:

1. Identify all sources of electrical energy and the means of disconnecting them.

2. Notify all affected personnel that equipment will be de-energized.
3. Load the equipment/circuit, if applicable, before disconnecting.
4. Open the disconnecting device(s) for each source of energy.
5. Apply lockout/tagout devices per [COMPANY NAME]'s LOTO program.
6. Verify the equipment is de-energized using an appropriately rated voltage testing device. Test the tester before and after use on a known live source.
7. Ground all phase conductors if there is a possibility of induced voltage or stored electrical energy.
8. Perform work only after all steps are complete and verified.

Re-Energization: Before circuits or equipment are re-energized, conduct visual inspection to ensure all tools, test equipment, and personnel are clear. Remove lockout/tagout devices. Notify affected personnel before energizing.

5.3 PPE Categories and Arc Flash PPE Table

The following table outlines the minimum PPE requirements for each arc flash PPE Category per NFPA 70E:

PPE Category	Cal/cm ² Rating	Required PPE
CAT 1	4 cal/cm ²	Arc-rated long-sleeve shirt and pants or coverall (min 4 cal/cm ²); arc-rated face shield or flash suit hood; hard hat; safety glasses; hearing protection; heavy-duty leather gloves; leather footwear
CAT 2	8 cal/cm ²	Arc-rated long-sleeve shirt and pants or coverall (min 8 cal/cm ²); arc-rated flash suit hood or face shield with balaclava; hard hat; safety glasses; hearing protection; arc-rated gloves; leather footwear
CAT 3	25 cal/cm ²	Arc flash suit (jacket, pants, and hood) rated min 25 cal/cm ² ; arc-rated gloves; hard hat; safety glasses; hearing protection; arc-rated jacket and pants worn underneath; leather footwear
CAT 4	40 cal/cm ²	Arc flash suit (jacket, pants, and hood) rated min 40 cal/cm ² ; arc-rated gloves; hard hat; safety glasses; hearing protection; arc-rated shirt and pants worn underneath; leather footwear

Note: All arc-rated clothing and equipment must be properly maintained and inspected before each use. Contaminated, damaged, or worn PPE must be replaced immediately.

5.4 GFCIs and Assured Equipment Grounding

Per 29 CFR 1926.404(b)(1), [COMPANY NAME] shall use one or both of the following methods on construction sites:

Ground-Fault Circuit Interrupters (GFCIs):

- All 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites that are not part of the permanent wiring shall have GFCI protection.

- GFCIs shall be tested before each day's use per manufacturer's instructions.
- Defective GFCIs shall be removed from service immediately.

Assured Equipment Grounding Conductor Program (AEGCP):

- As an alternative or supplement to GFCIs, [COMPANY NAME] may implement an AEGCP.
- All equipment grounding conductors shall be tested for continuity and correct attachment.
- Testing shall occur before first use, after any repair, at intervals not exceeding 3 months, and before use after any incident that could cause damage.
- A competent person shall be designated to implement the program.
- All tests shall be documented and records maintained at the jobsite.

5.5 Overhead Power Line Clearance Distances

Per 29 CFR 1926.1408 and OSHA requirements, the following minimum clearance distances must be maintained from overhead power lines:

Voltage Range (kV)	Minimum Clearance Distance
Up to 50 kV	10 feet (3.05 m)
Over 50 to 200 kV	15 feet (4.60 m)
Over 200 to 350 kV	20 feet (6.10 m)
Over 350 to 500 kV	25 feet (7.62 m)
Over 500 to 750 kV	35 feet (10.67 m)
Over 750 to 1,000 kV	45 feet (13.72 m)

Note: If voltage is unknown and the utility owner cannot provide the information, the minimum clearance distance is 20 feet for lines rated over 350 kV to 1,000 kV, or 10 feet for voltages below 50 kV.

5.6 Temporary Wiring Requirements

Temporary electrical wiring on construction sites must comply with the following:

- Temporary wiring shall be removed immediately upon completion of the project or purpose.
- All temporary branch circuits shall originate from an approved power outlet or panel board.
- Receptacles on temporary circuits shall be of the grounding type.
- All flexible cords shall be rated for hard or extra-hard usage (e.g., S, ST, SO, STO, SJ, SJT, SJO, SJTO types).
- Flexible cords shall not be fastened with staples, hung from nails, or suspended by wire.
- All cords passing through work areas shall be protected from damage (covered, elevated, or routed away from traffic).
- Extension cords used with portable tools and equipment shall be the three-wire type.
- Each temporary circuit shall be protected by an overcurrent device of appropriate rating.

6. TRAINING REQUIREMENTS

[COMPANY NAME] shall provide electrical safety training to all employees who face risk of electric shock or arc flash hazards. Training shall be appropriate to the employee's job duties and classification.

6.1 Qualified Person Training

- Skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment
- Skills and techniques necessary to determine nominal voltage of exposed live parts
- Knowledge of approach boundary distances for the voltage levels involved
- Decision-making process for determining degree and extent of the hazard, including arc flash hazard analysis
- Proper selection and use of arc-rated PPE
- Lockout/tagout procedures for de-energizing electrical equipment
- Emergency procedures, including CPR/AED and rescue from contact with energized conductors
- Retraining at intervals not exceeding three (3) years or when procedures change

6.2 Unqualified Person Training

- Recognition of electrical hazards and understanding of approach boundaries
- Procedures for safe interaction around electrical equipment
- Emergency response and reporting procedures
- Proper use of GFCIs and extension cords

7. RECORDKEEPING

[COMPANY NAME] shall maintain the following records:

- **Training records:** Names, dates, content, and trainer information for all electrical safety training. Retained for duration of employment plus three (3) years.
- **Energized Electrical Work Permits:** All completed permits retained for a minimum of three (3) years.
- **Arc flash hazard analysis records:** All arc flash study reports, labels, and updates retained for the life of the equipment.
- **Equipment inspection and testing records:** GFCI testing logs, AEGCP testing records, and PPE inspection logs.

- **Incident investigation reports:** All electrical incidents and near-misses retained for a minimum of five (5) years.

APPENDIX A: ENERGIZED ELECTRICAL WORK PERMIT

ENERGIZED ELECTRICAL WORK PERMIT

Permit Number: _____ Date: _____

Job Location / Description: _____

Equipment / Circuit Identification: _____

Voltage Level: _____

Justification for Energized Work (check one):

- ☐ De-energization would create additional or increased hazards
- ☐ De-energization is infeasible due to equipment design or operational limitations

Explain justification: _____

: _____

Hazard Analysis Results:

Shock Hazard Analysis: _____ Available Fault Current: _____

Arc Flash Boundary: _____ Incident Energy (cal/cm²): _____

PPE Category Required: _____ Working Distance: _____

Required PPE for This Task:

- ☐ Arc-rated clothing (min _____ cal/cm²)
- ☐ Arc-rated face shield / flash suit hood
- ☐ Arc-rated gloves (Class _____)
- ☐ Hard hat (non-conductive)
- ☐ Safety glasses / goggles
- ☐ Hearing protection
- ☐ Insulated tools
- ☐ Voltage-rated rubber gloves with leather protectors

☐ Rubber insulating matting

☐ Other: _____

Safe Work Practices:

Barriers / barricades used: _____

Means of restricting access: _____

Shock protection approach boundaries identified? (Y/N):

Job Briefing Conducted:

Briefing Conducted By: _____ **Date / Time:** _____

Attendees:

1: _____

2: _____

3: _____

Approvals:

Requested By (Qualified Person): _____ **Date:** _____

Approved By (Safety Manager): _____ **Date:** _____

APPENDIX B: ELECTRICAL SAFETY INSPECTION CHECKLIST**ELECTRICAL SAFETY INSPECTION CHECKLIST**

Project / Location: _____

Date: _____

Inspector Name: _____

Title: _____

General Electrical Safety:

- ☐ All electrical panels are accessible (36-inch clearance maintained)
- ☐ Panel covers and doors are in place and closed
- ☐ Circuit breakers and disconnects are properly labeled
- ☐ No evidence of overheating, burning, or smoke damage
- ☐ Arc flash labels are present on all applicable equipment
- ☐ Approach boundary signage is posted where required

Portable Equipment & Extension Cords:

- ☐ Extension cords are rated for hard or extra-hard usage
- ☐ No visible damage to cords (cuts, fraying, exposed conductors)
- ☐ All cords have grounding prongs intact
- ☐ GFCIs are in use on all temporary circuits
- ☐ GFCIs have been tested today
- ☐ Cords are protected from damage in traffic areas
- ☐ No cords run through doors, windows, or holes in walls/ceilings

Overhead Power Lines:

- ☐ Minimum clearance distances are maintained
- ☐ Warning signs/barriers in place where applicable
- ☐ Spotters assigned for crane/equipment operations near power lines

PPE & Tools:

- ☐ Insulated tools are in good condition (no cracks or damage)

- ☐ Voltage-rated gloves are within test date
- ☐ Arc-rated clothing is clean and undamaged
- ☐ Voltage detectors are functioning and calibrated

Corrective Actions Required:

Item 1: _____

Item 2: _____

Item 3: _____

Inspector Signature: _____

Date: _____

Supervisor Signature: _____

Date: _____

FORBES SAFETY SOLUTIONS

Electrical Grounding & Bonding Program

GFCI Protection, AEGCP & Equipment Grounding Requirements

Prepared for:

[COMPANY NAME]

Reference Standards:

29 CFR 1926.404-405 | NFPA 70 (NEC) | NFPA 70E

Date: [DATE] | Revision: [REV NUMBER]

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1. Purpose

This Electrical Grounding and Bonding Program establishes requirements for the proper grounding and bonding of electrical equipment and systems at [COMPANY NAME] construction sites and facilities. This program ensures compliance with 29 CFR 1926.404-405, NFPA 70 (National Electrical Code), and NFPA 70E (Standard for Electrical Safety in the Workplace).

Proper grounding and bonding protects employees from electrical shock, electrocution, and fire hazards by providing a low-impedance path for fault currents to safely return to the source and trip protective devices.

2. Scope

This program applies to all [COMPANY NAME] construction sites, temporary wiring installations, and operations where portable electric tools, equipment, and extension cords are used. It covers:

- Ground-fault circuit interrupter (GFCI) protection
- Assured Equipment Grounding Conductor Program (AEGCP) as an alternative
- Equipment grounding requirements
- Temporary wiring installations
- Extension cord use and inspection
- Double-insulated tool identification

3. Responsibilities

3.1 Management

- Provide GFCI-protected outlets or fund the AEGCP
- Ensure adequate electrical testing equipment is available
- Support program enforcement and employee training

3.2 Safety Manager / Competent Person

- Develop and maintain this program
- Designate a competent person to implement the AEGCP (if used)
- Conduct or oversee required electrical testing

- Maintain all test logs and inspection records
- Conduct employee training on electrical safety

3.3 Designated Competent Person (AEGCP)

Per 29 CFR 1926.404(b)(1)(iii), when the AEGCP is implemented in lieu of GFCIs, a designated competent person shall:

- Implement and oversee the daily testing and inspection program
- Conduct or supervise all required equipment grounding conductor tests
- Maintain written test records and inspection logs
- Remove defective equipment from service immediately

3.4 Supervisors

- Ensure GFCI protection is used or AEGCP is in effect before work begins
- Monitor employees for proper cord and equipment use
- Report defective equipment and remove from service

3.5 Employees

- Use GFCI-protected outlets for all 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites
- Visually inspect cords and equipment daily before use
- Report defective equipment immediately; do not use
- Never remove or bypass the ground prong on a plug

4. Equipment Grounding Requirements

4.1 General Requirements

Per 29 CFR 1926.404(f), the following equipment must be grounded:

- All 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites that are not part of the permanent wiring
- All frames of non-current-carrying metal parts of portable and plug-connected equipment
- All cord sets (extension cords) must have an equipment grounding conductor

- Generator frames must be grounded to the system ground unless meeting specific isolation exceptions

4.2 Ground-Fault Protection Methods

[COMPANY NAME] shall use one of the following two methods for ground-fault protection on construction sites per 29 CFR 1926.404(b)(1):

Option 1: Ground-Fault Circuit Interrupters (GFCIs)

- All 120-volt, single-phase, 15- and 20-ampere receptacle outlets that are not part of the permanent wiring must be protected by GFCIs
- GFCIs detect imbalances as low as 4–6 milliamps and disconnect power in 1/40th of a second
- GFCI protection may be provided by GFCI-protected receptacles, portable GFCI devices, or GFCI breakers

Option 2: Assured Equipment Grounding Conductor Program (AEGCP)

- An alternative to GFCIs that relies on a rigorous testing and inspection program
- Requires a designated competent person to administer
- See Section 5 for detailed AEGCP requirements

5. Assured Equipment Grounding Conductor Program (AEGCP)

When [COMPANY NAME] elects to use the AEGCP as an alternative to GFCI protection per 29 CFR 1926.404(b)(1)(iii), the following requirements apply:

5.1 Written Program Requirements

- The AEGCP must be in writing
- The written program must be available on the job site
- A designated competent person must be responsible for the program
- The program must cover all cord sets, receptacles not part of permanent wiring, and equipment connected by cord and plug that are available for use or used by employees

5.2 Testing Requirements

The following tests must be performed on all covered equipment and cord sets:

Test Type	Requirement	Frequency
-----------	-------------	-----------

Continuity Test	Verify the equipment grounding conductor is electrically continuous from the tool/equipment through the cord to the plug ground prong	Before first use, after repair, and every 3 months
Ground Prong Test	Verify the ground prong is present, not bent or broken, and makes proper contact	Before first use, after repair, and every 3 months
Terminal Connection Test	Verify proper connections of the equipment grounding conductor at the tool and at all plug/receptacle connections	Before first use, after repair, and every 3 months

5.3 Testing Frequency Summary

- Before first use on a job site
- Before return to use after any repairs
- Before use after any incident that could have caused damage
- At intervals not exceeding 3 months (quarterly)

Note: More frequent testing may be warranted in harsh environments or where damage is likely.

5.4 Testing Procedures

1. Use a circuit tester or continuity tester approved for the purpose
2. Test from the ground pin of the plug to the exposed metal frame of the tool
3. Resistance should read near zero ohms (typically <1 ohm for continuity)
4. For receptacles: test from the ground slot to the ground bus in the distribution panel
5. Record all test results on the AEGCP Test Log (Appendix A)

5.5 Color Coding / Identification

Equipment and cord sets that pass testing must be identified by a color-coded marking system:

Quarter	Period	Color Code
Q1	January – March	[COMPANY DESIGNATED COLOR]
Q2	April – June	[COMPANY DESIGNATED COLOR]
Q3	July – September	[COMPANY DESIGNATED COLOR]
Q4	October – December	[COMPANY DESIGNATED COLOR]

Equipment that has not been tested or has failed testing shall NOT have the current quarter color code applied and shall be removed from service.

6. Visual Inspections

In addition to the AEGCP testing, all employees shall perform visual inspections of electrical equipment and cords before each use:

- Check for external defects — fraying, exposed conductors, cut or damaged outer jacket
- Verify ground prong is intact and not bent or missing
- Check plug and connector housing for cracks or damage
- Verify strain relief is intact at both ends
- Check for signs of overheating (discoloration, melting, burning smell)
- Inspect tool housing for cracks that expose internal components

Any cord or equipment failing visual inspection shall be immediately removed from service, tagged "DEFECTIVE — DO NOT USE," and reported to the supervisor.

7. Ground Fault Interrupters

When GFCIs are used as the primary protection method:

- Test GFCI devices before each day's use by pressing the "TEST" button to verify the device trips, then pressing "RESET"
- GFCI devices that do not trip during the test shall be removed from service
- Use GFCI protection on all generators used on construction sites for 15- and 20-amp, 120-volt circuits
- Portable GFCI devices must be connected directly to the outlet — not on extension cords downstream
- Replace GFCI devices that show signs of damage or malfunction

8. Temporary Wiring

Temporary wiring installations on construction sites shall comply with 29 CFR 1926.405(a):

- Temporary wiring is permitted during construction, remodeling, maintenance, or demolition
- All temporary wiring shall be removed immediately upon completion of the project
- Receptacles shall be of the grounding type and connected to a ground
- Branch circuits must have an equipment grounding conductor

- Temporary lights must be protected by guards unless bulbs are deeply recessed
- Temporary lights must not be suspended by their cords unless designed for that purpose
- Splices in temporary wiring must have insulation equivalent to the cord
- Lamps for general illumination must be protected from contact and breakage

9. Extension Cord Requirements

Extension cords (cord sets) used on [COMPANY NAME] job sites must meet the following requirements:

- Three-wire type (hot, neutral, ground) with an equipment grounding conductor
- Listed or labeled by a nationally recognized testing laboratory (UL, CSA, ETL)
- Rated for hard or extra-hard usage (SO, SOW, ST, STW, or equivalent designations)
- Proper wire gauge for the load and length (e.g., 12 AWG minimum for 100-foot runs at 15 amps)
- Must be protected from damage — not run through doorways, windows, or holes unless protected
- Must not be fastened with staples, hung from nails, or suspended by the cord unless designed for it
- Must be used within rated capacity — never daisy-chain multiple extension cords
- Ground prong must NEVER be removed, bent back, or bypassed

10. Double-Insulated Tool Identification

Double-insulated tools are an acceptable alternative to equipment grounding per 29 CFR 1926.404(f)(3) (i):

- Double-insulated tools are identified by the "double square" symbol (◻ within ◻) on the tool nameplate
- These tools have two-prong plugs (no ground prong) and do not require grounding
- The outer housing provides a second layer of insulation beyond the normal internal insulation
- Double-insulated tools must still be visually inspected before use
- If the outer housing is cracked or damaged, the tool shall be removed from service — the secondary insulation has been compromised
- Double-insulated tools should not be used in wet conditions without additional GFCI protection

11. Training

All employees who use portable electrical tools, equipment, or extension cords shall be trained on:

6. Electrical hazards (shock, electrocution, arc flash, fire)
7. The purpose and function of equipment grounding
8. GFCI operation, testing, and use
9. AEGCP requirements (if applicable to the job site)
10. Visual inspection procedures for cords and equipment
11. Extension cord requirements and limitations
12. Identification of double-insulated tools
13. Reporting procedures for defective equipment
14. Emergency procedures for electrical incidents

Training shall be provided before initial assignment and refreshed annually or when site conditions change.

12. Recordkeeping

- AEGCP test logs (retain for duration of project plus 3 years)
- Equipment and cord inspection logs
- GFCI test documentation (daily test records)
- Employee training records
- Records of defective equipment removed from service

Appendix A: AEGCP Test Log

Job Site / Location: _____

Competent Person: _____

Testing Quarter / Period: _____

Color Code for This Quarter: _____

Date	Equipment / Cord ID	Description	Continuity OK?	Ground Prong OK?	Connections OK?	Pass/ Fail	Color Applied	Tester Initials

Equipment Failing Test — Corrective Action:

Competent Person Signature: _____

Date: _____

Job Site / Location: _____

Inspector Name: _____

Date: _____

Daily Visual Inspection Record:

[illegible]

Items Removed from Service:

Date	Cord / Equipment ID	Reason Removed	Disposition (Repair/Destroy)	Follow-Up Date

Inspector Signature: _____

Date: _____

FORBES SAFETY SOLUTIONS

LOCKOUT/TAGOUT

Control of Hazardous Energy Program

29 CFR 1910.147

[COMPANY NAME]

[ADDRESS]

[CITY, STATE ZIP]

Effective Date: [DATE]

Revision: [REV #]

Approved By: [NAME/TITLE]

1. PURPOSE & SCOPE

This Lockout/Tagout (LOTO) Program establishes the minimum requirements for the control of hazardous energy during servicing and maintenance of machines and equipment at [COMPANY NAME]. This program is designed to prevent the unexpected energization, startup, or release of stored energy that could cause injury to employees.

This program applies to all [COMPANY NAME] employees, contractors, and subcontractors who perform servicing, maintenance, or repair work on machines and equipment where the unexpected energization or release of stored energy could cause injury. This program covers all forms of hazardous energy including, but not limited to: electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravitational, and other energy sources.

This program does not apply to:

- Minor tool changes and adjustments that are routine, repetitive, and integral to the use of the equipment, provided work is performed using alternative protective measures
- Work on cord-and-plug-connected electrical equipment where the hazard is controlled by unplugging the equipment and the plug is under the exclusive control of the employee performing the work
- Hot tap operations involving transmission and distribution systems for gas, steam, water, or petroleum products when performed under established procedures and continuity of service is essential

2. REGULATORY REFERENCES

- 29 CFR 1910.147 — The Control of Hazardous Energy (Lockout/Tagout)
- 29 CFR 1910.333 — Selection and Use of Work Practices (Electrical)
- 29 CFR 1910.269 — Electric Power Generation, Transmission, and Distribution
- ANSI/ASSE Z244.1 — Control of Hazardous Energy
- NFPA 70E — Standard for Electrical Safety in the Workplace

3. DEFINITIONS

Authorized Employee: A person who locks out or tags out machines or equipment in order to perform servicing or maintenance. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing servicing or maintenance on a machine or equipment that must be locked or tagged out.

Affected Employee: An employee whose job requires operating or using a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires working in an area in which such servicing or maintenance is being performed.

Other Employee: An employee who may be in the area where energy control procedures are being implemented but is neither an authorized nor affected employee.

Energy Isolating Device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to: manually operated electrical circuit breakers, disconnect switches, manually operated switches, slide gates, slip blinds, line valves, blocks, and similar devices used to block or isolate energy. Push buttons, selector switches, and other control circuit type devices are NOT energy isolating devices.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Lockout Device: A device that uses a positive means (such as a lock, either key or combination type) to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

Tagout Device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Zero Energy State: The condition achieved when all hazardous energy sources have been isolated, locked/tagged out, and verified as de-energized.

4. ROLES & RESPONSIBILITIES

4.1 Management/Program Administrator

- Establish, implement, and maintain this LOTO program
- Ensure adequate resources are available for program implementation (locks, tags, hasps, lockout devices)
- Ensure periodic inspections are conducted at least annually
- Ensure all affected employees receive appropriate training
- Review and update this program as necessary, but at least annually
- Maintain records of training, inspections, and equipment-specific procedures

4.2 Supervisors

- Ensure employees under their supervision comply with this program

- Ensure equipment-specific LOTO procedures are developed for all applicable machines and equipment
- Coordinate lockout/tagout activities with affected departments and contractors
- Ensure employees are trained and authorized before performing LOTO
- Participate in periodic inspections and enforce corrective actions

4.3 Authorized Employees

- Apply lockout/tagout devices in accordance with this program and equipment-specific procedures
- Perform servicing and maintenance activities only after verifying zero energy state
- Remove only their own locks and tags upon completion of work
- Notify affected employees before applying and removing LOTO devices
- Participate in required training and periodic inspections

4.4 Affected Employees

- Do not attempt to restart or re-energize machines or equipment that are locked/tagged out
- Understand the purpose and function of LOTO procedures
- Report any violations of this program to their supervisor
- Participate in required training

5. ENERGY SOURCE IDENTIFICATION

[COMPANY NAME] shall conduct a survey of all machines and equipment to identify all sources of hazardous energy. The following energy sources shall be identified and documented for each piece of equipment:

Energy Type	Examples	Isolation Methods
Electrical	Power supply, batteries, capacitors, static charge	Disconnect switch, circuit breaker, removal of fuses
Mechanical	Flywheels, springs, gears, belts, pulleys	Blocking, braking, disconnecting
Hydraulic	Hydraulic lines, accumulators, rams	Valve closure, bleeding, blanking
Pneumatic	Air lines, compressed gas cylinders, reservoirs	Valve closure, bleeding, disconnecting
Chemical	Process lines, tanks, piping systems	Double block & bleed, blanking, draining
Thermal	Steam lines, furnaces, heated materials	Valve closure, cooling, insulating
Gravitational	Elevated components, counterweights,	Blocking, pinning, cribbing, lowering

Energy Type	Examples	Isolation Methods
	suspended loads	
Stored/Residual	Capacitors, springs, elevated machine members	Grounding, repositioning, bleeding, blocking

Equipment-specific energy control procedures shall be developed for each machine or piece of equipment and shall include:

- A description of the machine/equipment and its intended use
- The specific location of all energy isolating devices
- The type and magnitude of energy the machine/equipment uses
- The specific steps required to shut down, isolate, block, and secure the machine/equipment
- The specific steps required to verify isolation and de-energization
- The specific steps for returning the machine/equipment to normal operation

6. LOCKOUT/TAGOUT PROCEDURES

6.1 Preparation for Shutdown

1. The authorized employee shall identify the type and magnitude of energy that the machine or equipment utilizes.
2. The authorized employee shall understand the hazards of the energy to be controlled and the method(s) to control the energy.
3. The authorized employee shall review the equipment-specific LOTO procedure.
4. The authorized employee shall notify all affected employees that servicing is required and that the machine/equipment will be shut down and locked out.
5. The authorized employee shall gather all necessary lockout/tagout devices and hardware.

6.2 Machine/Equipment Shutdown

6. Shut down the machine or equipment using the normal stopping procedure.
7. Operate all shut-down controls to bring the machine or equipment to a complete stop.
8. Move all control switches and selectors to the "OFF" or "NEUTRAL" position.

6.3 Machine/Equipment Isolation

9. Locate all energy isolating devices for the machine/equipment as identified in the equipment-specific procedure.
10. Operate all energy isolating devices to isolate the machine/equipment from its energy source(s).
11. Ensure all stored or residual energy is relieved, disconnected, restrained, or otherwise rendered safe.

6.4 Application of Lockout/Tagout Devices

12. Each authorized employee shall affix their individually assigned lock to each energy isolating device.
13. Each authorized employee shall attach a completed tagout tag to each lock identifying: the employee's name, date, department, reason for lockout, and expected duration.
14. Locks shall be applied so that the energy isolating device is held in the "safe" or "off" position.
15. Where a tagout device is used without a lock (only when lockout is not possible), the tag shall be attached at the same location the lock would have been placed.

6.5 Verification of Isolation (Zero Energy State)

16. After applying LOTO devices, verify that all energy sources have been isolated by attempting to restart the machine/equipment using normal operating controls.
17. Return operating controls to the "OFF" or "NEUTRAL" position after verification.
18. Test all electrical circuits using an appropriate voltage testing device to verify de-energization.
19. Verify that all stored/residual energy has been relieved (check pressure gauges, try moving mechanical parts, check for flow, temperature, etc.).
20. The machine/equipment is now in a zero energy state and servicing may begin.

6.6 Restoring Machine/Equipment to Service

21. Inspect the work area to ensure all tools, parts, and non-essential items have been removed.
22. Ensure all guards and safety devices have been reinstalled and are functional.
23. Verify all employees are clear of the machine/equipment and positioned safely.
24. Notify all affected employees that locks and tags are being removed and the machine/equipment will be re-energized.
25. Each authorized employee shall remove ONLY their own lock(s) and tag(s).
26. Re-energize the machine/equipment following the equipment-specific procedure.
27. Verify proper operation of the machine/equipment and all safety devices.

7. GROUP LOCKOUT/TAGOUT PROCEDURES

When servicing or maintenance is performed by a crew, crafts, departments, or other group, a group lockout/tagout procedure shall provide a level of protection equivalent to that provided by personal lockout/tagout devices.

28. A designated authorized employee shall be assigned overall responsibility for the group lockout/tagout.
29. The designated authorized employee shall ascertain the exposure status of all members of the group.
30. The designated authorized employee shall apply a group lockout device (multi-lock hasp) to each energy isolating device.
31. Each authorized employee in the group shall affix their personal lock to the group lockout device.
32. The designated authorized employee shall verify isolation and communicate the zero energy state to the group.
33. When work is completed, each authorized employee shall remove their personal lock.
34. The designated authorized employee shall remove the group lockout device only after all personal locks have been removed and all group members are accounted for.

7.1 Shift/Personnel Changes

When servicing extends across shifts, the following procedures shall be followed:

- The off-going shift's authorized employee(s) shall communicate the status of lockout to the on-coming shift's authorized employee(s).
- On-coming authorized employees shall apply their locks BEFORE off-going employees remove their locks.
- A documented transfer of lockout responsibility shall be completed at each shift change.

8. LOCK REMOVAL BY OTHER THAN THE APPLYING EMPLOYEE

In the rare situation where an authorized employee is not available to remove their lock, the following procedure shall be followed:

35. Verify that the authorized employee who applied the lock is not at the facility.
36. Make all reasonable efforts to contact the authorized employee to inform them that their lock is being removed.
37. The removal must be authorized by [COMPANY NAME] management (minimum Supervisor level).
38. Document the circumstances and authorization for the removal.
39. Ensure the authorized employee is informed that their lock was removed before they resume work at the facility.

NOTE: This procedure should be used only as a last resort. Management shall investigate why the lock was not removed through normal procedures and take corrective action.

9. ENERGY ISOLATION DEVICE REQUIREMENTS

9.1 Lockout Devices

- Shall be standardized within [COMPANY NAME] by color, shape, or size
- Shall be durable enough to withstand the environment for the maximum period of expected exposure
- Shall be substantial enough to prevent removal without the use of excessive force or unusual techniques (bolt cutters, etc.)
- Each authorized employee shall be assigned their own uniquely keyed lock(s)
- No two locks shall be keyed alike; master keys are prohibited
- Locks shall be identified with the authorized employee's name

9.2 Tagout Devices

- Shall be standardized in print and format
- Shall be durable enough to withstand the environment for the maximum period of expected exposure
- Shall be attached with a non-reusable, self-locking nylon cable tie (minimum 50 lb. tensile strength)
- Shall clearly state: "DANGER — DO NOT OPERATE" or equivalent warning
- Shall include: employee name, date, department, reason, expected duration

- Tags shall never be bypassed, ignored, or removed by anyone other than the person who applied it

9.3 Additional Lockout Hardware

- Multi-lock hasps for group lockout situations
- Valve lockout devices for ball valves, gate valves, and butterfly valves
- Circuit breaker lockouts for various breaker types
- Plug lockout devices for electrical plugs
- Pneumatic/hydraulic lockout devices
- Lockout stations/boards for organized storage of lockout equipment

10. PERIODIC INSPECTIONS

[COMPANY NAME] shall conduct a periodic inspection of the energy control procedure at least annually to ensure the procedure and the requirements of this program are being followed.

10.1 Inspection Requirements

- The inspection shall be performed by an authorized employee other than the one(s) using the energy control procedure being inspected.
- The inspection shall include a review between the inspector and each authorized employee of the employee's responsibilities under the energy control procedure.
- Where tagout is used, the inspection shall include a review between the inspector and each authorized and affected employee of that employee's responsibilities under the energy control procedure.

10.2 Inspection Documentation

Each periodic inspection shall be documented and shall include:

- The machine or equipment on which the procedure was being utilized
- The date of the inspection
- The employees included in the inspection
- The name and signature of the person performing the inspection
- Any deficiencies identified and corrective actions taken

Inspection records shall be maintained by [COMPANY NAME] for a minimum of three (3) years.

11. TRAINING REQUIREMENTS

11.1 Authorized Employee Training

Each authorized employee shall receive training in the following:

- Recognition of applicable hazardous energy sources
- Type and magnitude of energy available in the workplace
- Methods and means necessary for energy isolation and control
- Purpose and use of the energy control procedure
- Equipment-specific LOTO procedures for equipment they are authorized to service
- Proper use of lockout/tagout devices and hardware
- Verification of zero energy state
- Group lockout/tagout procedures
- Procedures for lock removal by other than the applying employee

11.2 Affected Employee Training

Each affected employee shall receive training in the following:

- The purpose and use of energy control procedures
- Recognition of when the energy control procedure is being implemented
- The prohibition against attempting to restart or re-energize equipment that is locked/tagged out

11.3 Other Employee Training

All other employees whose work operations are or may be in an area where energy control procedures may be used shall be instructed about the prohibition against removing lockout/tagout devices and attempting to restart equipment that is locked/tagged out.

11.4 Retraining

Retraining shall be provided:

- When there is a change in job assignments
- When there is a change in machines, equipment, or processes that present a new hazard
- When there is a change in the energy control procedures
- When a periodic inspection reveals inadequacies in the employee's knowledge or use of the procedure
- At minimum intervals as determined by [COMPANY NAME] (recommended: annually)

11.5 Training Documentation

Training records shall include the employee's name, date of training, topics covered, trainer's name, and shall be maintained for the duration of employment plus three (3) years. All training shall be documented and records retained by [COMPANY NAME].

12. RECORDKEEPING

[COMPANY NAME] shall maintain the following records:

- This written LOTO program (current and previous versions)
- Equipment-specific energy control procedures for all applicable machines/equipment
- Energy source survey/inventory documentation
- Employee training records (initial and retraining)
- Annual periodic inspection records
- Lock removal authorization records
- Incident/near-miss investigation reports related to LOTO

All records shall be maintained for a minimum of three (3) years and shall be made available to employees and their authorized representatives upon request.

13. CONTRACTOR COORDINATION

When outside contractors perform work that requires lockout/tagout:

- [COMPANY NAME] shall inform the contractor of the energy control procedures used at the facility.
- The contractor shall inform [COMPANY NAME] of their lockout/tagout procedures.
- [COMPANY NAME] and the contractor shall coordinate their energy control activities to ensure full protection of all employees.
- Contractor employees shall use their own locks (distinctly different from [COMPANY NAME] locks) and shall be trained in [COMPANY NAME]'s LOTO program requirements.

14. PROGRAM REVIEW & REVISION HISTORY

This program shall be reviewed at least annually or whenever changes in operations, equipment, or regulatory requirements necessitate a revision.

Revision #	Date	Description of Change	Approved By

APPENDIX A: LOTO PROCEDURE FORM

Complete this form for each piece of equipment requiring lockout/tagout procedures.

Field	Information
Equipment Name:	
Equipment ID/Number:	
Equipment Location:	
Date Prepared:	
Prepared By:	
Approved By:	

Energy Source Identification

Energy Type	Source/Location	Magnitude	Isolation Device	Isolation Method
Electrical				
Mechanical				
Hydraulic				
Pneumatic				
Chemical				
Thermal				
Gravitational				
Other:				

Lockout/Tagout Sequence

Step #	Procedure Description	Isolation Device Location
1		
2		
3		
4		

Step #	Procedure Description	Isolation Device Location
5		
6		
7		
8		

Verification of Zero Energy State

Verification Method	Result (Pass/Fail)	Verified By	Date

Restoring Equipment to Service

Step #	Procedure Description
1	
2	
3	
4	
5	

APPENDIX B: ANNUAL PERIODIC INSPECTION LOG

Use this form to document the required annual periodic inspection of energy control procedures per 29 CFR 1910.147(c)(6).

Field	Information
Inspection Date:	
Inspector Name:	
Inspector Signature:	
Equipment/Procedure Inspected:	
Location:	

Employees Reviewed During Inspection

Employee Name	Role (Auth/Affected)	Review Completed (Y/N)	Signature

Inspection Findings

Item #	Finding/Deficiency	Corrective Action Required	Date Corrected
1			
2			
3			
4			
5			

Inspector Certification

I certify that the periodic inspection was conducted in accordance with 29 CFR 1910.147(c)(6) and that the energy control procedure(s) identified above have been reviewed with the employees listed.

Inspector Signature: _____ Date: _____

Management Review: _____ Date: _____

FORBES SAFETY SOLUTIONS

ELECTRICAL SAFETY & ARC FLASH AWARENESS

Toolbox Talk — Electrical Hazard Awareness

[Company Name]

[Date]

Reference: 29 CFR 1910.331-335 | NFPA 70E | 29 CFR 1926.405

WHY THIS MATTERS

Arc flash can reach temperatures of 35,000°F — four times hotter than the surface of the sun.

~1,000

Electrical injuries
per year in
U.S. workplaces

5–10

Arc flash incidents
per day in the U.S.
(NFPA data)

35,000°F

Arc flash
temperature —
explosive force

ARC FLASH & APPROACH BOUNDARIES

WHAT IS ARC FLASH?

An arc flash is an explosive release of energy caused by an electrical fault between conductors or a conductor and ground.

Dangers include:

- Temperatures up to 35,000°F
- Explosive pressure wave (blast)
- Molten metal shrapnel
- Intense light — can cause blindness
- Severe burns and hearing damage

APPROACH BOUNDARIES (NFPA 70E)

BOUNDARY	WHO MAY ENTER	REQUIREMENT
Arc Flash Boundary	Qualified / Unqualified w/ PPE	Arc-rated PPE required
Limited Approach	Qualified persons only	Shock hazard awareness
Restricted Approach	Qualified with written plan	Insulated tools & shock PPE
Prohibited Approach	Same as direct contact	Same PPE as direct contact

PPE CATEGORIES & QUALIFIED PERSONS

ARC FLASH PPE CATEGORIES (NFPA 70E)

CAT	cal/cm ²	REQUIRED PPE
1	4	Arc-rated shirt/pants, safety glasses, hearing protection, leather gloves
2	8	Cat 1 + arc-rated face shield, balaclava
3	25	Arc flash suit hood, arc-rated jacket/pants, insulated gloves w/ leather protectors
4	40	Multi-layer arc flash suit, heavy-duty insulated gloves, full face shield + hood

QUALIFIED VS. UNQUALIFIED

Qualified Person:

- Trained to work on or near exposed energized parts
- Can identify hazards and determine approach boundaries
- Authorized to enter restricted/prohibited boundaries

Unqualified Person:

- Must stay outside the limited approach boundary
- May NOT work on energized equipment
- Must be escorted if entering limited boundary

KEY ELECTRICAL SAFETY RULES

DE-ENERGIZE FIRST

De-energizing is ALWAYS the safest option.

Lockout/Tagout (LOTO) Steps:

- Notify all affected employees
- Identify all energy sources
- Isolate energy sources
- Apply lockout/tagout devices
- Verify zero energy state
- Test before you touch!

CONSTRUCTION SITE REQUIREMENTS

GFCIs required on all construction sites

(29 CFR 1926.405)

- Inspect all cords and tools before each use
- Keep minimum 10 ft clearance from overhead power lines (up to 50kV)
- Never use damaged cords — replace immediately
- Do not overload circuits or use multi-outlet adapters
- Mark all electrical panels — keep 36" clearance
- Report any shock, tingle, or sparking immediately

QUIZ / DISCUSSION

Q1 What is the safest approach before performing electrical work?

Answer: De-energize the equipment first using Lockout/Tagout (LOTO) procedures, then verify zero energy before starting work.

Q2 What PPE category requires a full arc flash suit, and what is its cal/cm² rating?

Answer: Category 4 — rated at 40 cal/cm². Requires multi-layer arc flash suit, heavy-duty insulated gloves, full face shield and hood.

Q3 Can an unqualified person work inside the limited approach boundary?

Answer: No. Unqualified persons must stay outside the limited approach boundary and may only enter if escorted by a qualified person.

ATTENDANCE SIGN-OFF

By signing below, I acknowledge that I attended and understood this Toolbox Talk on Electrical Safety / Arc Flash Awareness.

#	PRINTED NAME	SIGNATURE	DATE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

LOCKOUT/TAGOUT (LOTO)

29 CFR 1910.147

Presenter: _____

Date: _____

WHY THIS MATTERS

- Failure to control hazardous energy kills an estimated 48 workers per year and causes 17,690 lost-workday injuries (NSC 2023 data).
- OSHA estimates that proper compliance with the LOTO standard would prevent 120 fatalities and 50,000 injuries every year.
- LOTO violations are consistently in OSHA's Top 10 most cited standards. "I thought the power was off" has been the last thought of too many workers.
- Hazardous energy doesn't just mean electrical. Hydraulic lines hold pressure, springs store mechanical energy, pipes carry steam, and chemical reactions continue after shutdown.
- Every incident investigation involving uncontrolled energy comes back to the same root cause: someone skipped a step because they were in a hurry.

Source: [OSHA LOTO Fact Sheet](#)

ENERGY TYPES & ISOLATION PROCEDURES

- Six energy types to control: ELECTRICAL (disconnect and verify zero energy), MECHANICAL (block/secure moving parts), HYDRAULIC (bleed lines and block), PNEUMATIC (bleed air pressure), THERMAL (allow cool-down or insulate), CHEMICAL (drain, purge, or neutralize).
- Every piece of equipment must have a written, machine-specific LOTO procedure. Generic procedures get people killed — each machine has unique energy sources and isolation points.
- The isolation sequence: (1) Notify all affected employees, (2) Shut down equipment using normal stopping procedure, (3) Isolate ALL energy sources, (4) Apply YOUR lock and tag, (5) Verify zero energy state.
- Verification is the most skipped and most critical step. After lockout, attempt to start the equipment. Test circuits with a meter. Bleed trapped pressure. Verify. Every. Time.
- Tags are NOT locks. A tag is a warning device only — it does not physically prevent operation. Every worker in the danger zone must apply their own lock.

GROUP LOTO & CRITICAL RULES

- Group LOTO: When multiple crews work on the same equipment, a primary authorized employee coordinates lockout. Each worker still applies their own lock to a group lockbox.
- Shift change protocol: The outgoing shift cannot remove their locks until the incoming shift has applied theirs. There must be zero gap in protection.
- NEVER remove another person's lock. The only person who removes a lock is the person who put it on. If they left site, follow the employer's specific lock-removal procedure with supervisor authorization and documented verification.
- Try-out procedure after maintenance: Ensure all workers are clear, all tools removed, guards replaced, then remove locks in reverse order. The primary authorized employee removes the last lock.
- Annual inspections of LOTO procedures are required. An authorized employee who does NOT normally use the procedure must review it. Document the review with names, dates, and equipment covered.

DISCUSSION QUESTIONS

Take 5 minutes to discuss with your crew:

1. Can you name all the energy sources on the equipment you're working with today? Are you sure you've got them all?
2. When was the last time you actually tried to start a machine after locking it out to verify zero energy?
3. Have you ever been pressured to skip LOTO because the job would "only take a minute"? What happened?
4. If you found a lock on equipment with no tag or an unreadable tag, what would you do?

ATTENDANCE SIGN-OFF

Date: _____ Topic: Lockout/Tagout (LOTO) Presenter: _____

#	PRINT NAME	COMPANY	SIGNATURE
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