



ELECTRICAL SAFETY AND TEMPORARY POWER

Ground-Fault Protection, Temporary Wiring and Electrical Exposure Control

POLICY STANDARD

Electrical equipment and temporary power shall be planned, installed, used and maintained to prevent shock, electrocution, arc, fire and contact with energized systems. Employees shall use GFCI protection as company practice, inspect equipment before use and stop work whenever electrical safety is uncertain.

PHEIFER BROTHERS CONSTRUCTION CO., INC.

Effective August 25, 2026 | Revision 1

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USE OF THIS POLICY

This policy states minimum company expectations and is not all-inclusive. OSHA requirements, the National Electrical Code as incorporated by OSHA, utility rules, manufacturer instructions, project specifications and any more protective requirement also apply.

Primary Regulatory References

- 29 CFR 1926 Subpart K, including 1926.403, .404, .405, .416 and .417
- 29 CFR 1926.302(a) - Electric power-operated hand tools
- 29 CFR 1926 Subpart V and 1926.1407-1411 - Power transmission and crane power-line safety
- Company Hazardous Energy Control, Utility-Strike Prevention, Crane and Emergency Response policies

1. Purpose, Scope and Responsibilities

Purpose and Scope

- Applies to temporary services, panels, receptacles, cords, portable tools, lighting, generators, pumps, welders, heaters, trailers and other electrical equipment used on heavy-highway, bridge, marine, yard, shop and support work.
- Covers employees who install, operate near, connect to or use electrical systems. Utility-owned generation, transmission and distribution work requires the additional rules of 29 CFR 1926 Subpart V.

Management / Project Management

- Provide listed/labeled equipment suitable for the environment, qualified electrical resources, GFCI protection, inspections, training, emergency planning and time to correct defects.
- Coordinate temporary-service design, utility interfaces, shutdowns and subcontractor responsibilities. Obtain permits/inspections required by the authority having jurisdiction.

Qualified Person

- Perform electrical installation, testing, troubleshooting and work on or near exposed energized parts within training and authorization.
- Know the construction and operation of assigned equipment, hazards involved, voltage determination, approach/insulating techniques and PPE required for the task.

Competent Person / Foreman

- Plan the work, identify electrical hazards, confirm controls, inspect field conditions and remove employees/equipment from exposure until corrected.
- Ensure unauthorized employees do not open panels, alter wiring, reset repeatedly tripping protection or perform electrical repairs.

Employees

- Use equipment only as intended; inspect cords/tools/GFCIs before use; keep clear of electrical hazards; report shocks, tingles, damaged equipment and changed conditions immediately.
- Use stop-work authority without retaliation. Never assume a wire, panel, structure or piece of equipment is deenergized.

Subcontractors

- Provide compliant systems and qualified personnel; communicate energization, testing, outages and restrictions to Pheifer Brothers and affected employers.

2. Planning and Qualified-Person Controls

Pre-Task Electrical Assessment

- Identify every source: utility service, temporary service, generator, battery/storage, inverter, solar source, backfeed, equipment circuit, underground line and overhead line.
- Determine voltage, environment, conductive surfaces, water exposure, routing, traffic/equipment damage, required GFCI/grounding, disconnects and emergency shutdown.
- Verify source capacity, overcurrent protection, panel/circuit identification and grounding/bonding arrangement for temporary systems.

Deenergization Is the Default

- Before employees work on or near exposed live parts, deenergize and apply the Hazardous Energy Control procedure unless deenergizing introduces additional/increased hazards or is infeasible because of equipment design or operational limitations.
- Only a qualified person may determine and document whether energized work is justified and what protective measures apply. Convenience, schedule or avoiding an outage is not justification.

Unqualified Employees

- May use approved cord-and-plug equipment, normal switches and receptacles after training and inspection.
- Shall not enter guarded electrical spaces, remove covers, open energized panels, test voltage, splice/repair cords, replace breakers/fuses or approach exposed energized parts.

Equipment Approval

- Use equipment that is approved, listed/labeled where required and installed/used according to its listing, labeling and manufacturer instructions.
- Do not modify plugs, grounding pins, guards, overcurrent devices, interlocks or enclosures. Homemade adapters and improvised distribution equipment are prohibited.

Coordination

- Include electrical controls in the JHA and coordinate with cranes, aerial lifts, excavation, concrete pumping, welding, water work, live traffic, public access and severe weather.
- Before another employer energizes or changes a system, notify affected crews and reverify boundaries, GFCIs, grounding, labeling and shutdown method.

Readiness Hold Point

- No temporary power is energized until installation, protection, environmental suitability, grounding/bonding and required testing are verified by the responsible qualified person.

3. Temporary Wiring, Panels and Distribution

Temporary Installations

- Temporary wiring shall meet 29 CFR 1926.405 and be removed when its construction purpose is complete. It is not a substitute for permanent wiring.
- Protect conductors from physical damage, sharp edges, vehicles, equipment, pinch points, heat, oil, chemicals, water and falling material. Support wiring with approved nonconductive means; do not use nails, bare wire or methods that damage insulation.
- Do not lay conductors/cords on floors, ground or through openings where subject to damage unless protected by location or guards.

Panels and Distribution

- Keep panelboards, switchboards, transformers, disconnects and distribution boxes closed, guarded, weather-suitable, upright/stable, labeled and accessible to authorized persons.
- Maintain required working space and clear access. Do not store materials in electrical working space or require a worker to stand in traffic, water or a collapse zone to operate equipment.
- Use approved blanks/covers for unused openings. Guard live parts operating at 50 volts or more against accidental contact.

Circuits and Protection

- Match conductors, receptacles, plugs and equipment to circuit voltage, ampacity and load. Never bypass, oversize or defeat breakers/fuses.
- Do not use household power strips, cube taps or multi-outlet adapters as construction distribution unless specifically listed and suitable for the location/use.
- A breaker/GFCI that trips indicates a possible fault or overload. Stop and have the cause corrected; do not repeatedly reset protection.

Receptacles and Disconnects

- Use grounding-type receptacles/cords where grounding is required. Do not reverse polarity or use grounding terminals for another purpose.
- Disconnects shall be readily accessible, identify the equipment/circuit controlled and indicate open/off or closed/on position.
- Protect outdoor/wet-location receptacles with approved covers that maintain the required rating with plugs inserted.

Splices and Repairs

- Only authorized qualified persons may make splices/terminations using devices intended for the conductor, voltage and environment.
- Electrical tape alone is not an acceptable repair for a damaged cord jacket, plug, connector or strain relief. Remove defective equipment from service.

4. GFCIs and Grounding Protection

Company Requirement

- Pheifer Brothers requires approved GFCI personnel protection for 120-volt, single-phase, 15- and 20-ampere receptacles used by employees on construction sites when the receptacle is not part of permanent wiring.
- Use GFCI protection for cord-and-plug tools/equipment in wet, damp, outdoor, bridge-deck, excavation, cofferdam and conductive work locations. More protective requirements apply.
- The OSHA exception for certain isolated receptacles on generators rated not more than 5 kW does not override this company rule unless management and a qualified person approve a documented project-specific variance.

GFCI Placement and Testing

- Place portable GFCI protection as close to the source as practicable so the extension cord is protected. Use equipment rated for the environment.
- Test portable GFCIs before the shift and after relocation, damage, trip, severe weather or suspected malfunction using TEST/RESET and manufacturer instructions.
- If a GFCI will not test/reset, trips repeatedly or equipment causes a trip, stop using the circuit/equipment. Never bypass the GFCI.

Assured Equipment Grounding Conductor Program

- OSHA permits a written AEGCP instead of GFCIs for covered receptacles/equipment. Pheifer Brothers uses GFCIs as its normal method.
- An AEGCP may be used only when formally designated for the project, available onsite and implemented by a competent person. It requires daily visual inspection plus continuity/polarity testing before first use, after repair, after suspected damage, and at intervals not exceeding three months (six months for fixed, protected cord sets/receptacles), with current records.
- A color-code sticker alone does not establish safe condition and never replaces the daily visual inspection.

Grounding

- Maintain a permanent, continuous equipment-grounding path. Never remove a grounding pin or use a three-to-two-prong adapter.
- Ground exposed non-current-carrying metal parts where required. Listed double-insulated tools need not be grounded but still require GFCI protection under company rules.
- Only qualified persons establish bonding, neutral and grounding-electrode connections for the actual system configuration.

5. Cords, Tools and Portable Equipment

Before Each Day's Use

- Inspect the entire cord, plug, receptacle, strain relief and connected tool for cuts, abrasion, crushed areas, exposed conductors, missing/deformed pins, loose parts, heat damage, contamination and suspected internal damage.
- Inspect housings, switches, guards, handles and labels. Confirm voltage/rating and environmental suitability; test GFCI protection.
- Tag and remove damaged equipment immediately. Do not use until repaired and tested by an authorized person.

Cord Selection

- Use three-wire, grounding-type hard- or extra-hard-usage flexible cord suitable for construction and the location; jacket markings shall remain legible.
- Select conductor size and length for the equipment load and voltage drop. Avoid daisy-chaining; provide a proper distribution point.
- Do not substitute flexible cords for fixed wiring, conceal them, attach them to building surfaces or route through doors/windows where pinched or damaged.

Use and Routing

- Connect/disconnect by grasping the plug, never the cord. Keep connections dry/off wet ground; do not handle energized plugs/tools with wet hands.
- Route cords outside walkways, ladders, scaffolds, traffic and equipment paths. Where crossing is unavoidable, use rated guards/ramps or safe support.
- Do not lift/lower tools by the cord, pull around sharp edges, expose to welding slag or allow equipment to run over cords.

Tool Operation

- Use required guards, side handles and accessories. Secure work and maintain stable footing, especially on steel, wet decks, barges and elevated work.
- Unplug and control stored energy before changing blades/bits, clearing jams, adjusting or servicing. Do not leave energized tools unattended.
- Use equipment rated for conductive, wet or hazardous locations; obtain qualified-person evaluation where flammable vapor/dust may create a classified location.

Repair

- Only authorized persons repair electrical equipment. Replacement components must restore rating, strain relief, grounding and enclosure integrity.
- Inspect/test after repair and perform AEGCP tests if the item is covered by an approved AEGCP.

6. Generators and Portable Power Sources

Setup

- Select a generator with adequate continuous/surge capacity. Follow manufacturer instructions for grounding/bonding, neutral configuration, GFCI protection, ventilation, weather protection and parallel operation.
- Locate on firm, level, dry ground outside traffic, excavation edges, collapse zones and flood paths. Barricade unauthorized access and protect cords/panels.
- Never operate a fuel-burning generator in an enclosed/partially enclosed area, trailer, building, tank, cofferdam or near air intakes/openings. Carbon monoxide can accumulate without warning.

Grounding and Bonding

- A portable generator frame may serve as the grounding electrode only when OSHA conditions are met: it supplies only generator-mounted and/or generator-receptacle cord-and-plug equipment, and required metal parts/grounding terminals are bonded to the frame.
- If connected to premises wiring, transfer equipment or another distribution arrangement, a qualified person determines grounding electrode, neutral bonding and transfer requirements.
- Never backfeed a building, trailer or utility system through a receptacle or improvised cord. Use approved transfer equipment installed by qualified persons.

Operation

- Inspect before use; test GFCIs; keep covers closed; maintain cooling/exhaust clearance; keep combustibles away. Do not overload or defeat protection.
- Shut down and allow cooling before refueling unless an approved manufacturer procedure applies. Control ignition sources, spills and static; use approved fuel containers.
- Protect workers/public from hot surfaces, exhaust, moving parts and noise.

Welders, Inverters and Batteries

- Use welding machines/inverters according to listing and instructions; protect leads/cables and isolate damaged equipment.
- Battery systems can create high fault current, chemical exposure and explosive gas. Remove jewelry, protect terminals, use insulated tools/PPE and provide ventilation/eyewash as applicable.
- Charging areas shall prevent ignition, shorting, vehicle impact and unauthorized contact.

Emergency Shutdown

- Post/communicate shutdown. Stop for overheating, smoke, fuel leak, damaged receptacle, repeated trip, shock/tingle, abnormal voltage or CO alarm/symptoms.

7. Wet Locations, Lighting and Specialty Conditions

Wet and Conductive Work

- Treat rain, standing water, wet bridge decks, barges, cofferdams, excavations, steel structures and metal tanks as elevated shock-risk environments.
- Keep distribution dry/elevated; use equipment/enclosures/connectors listed for the condition. Control water where practicable; do not place employees between energized equipment and grounded metal/water.
- Stop during flooding, water intrusion or weather that defeats enclosure ratings or safe access.

Temporary Lighting

- Provide suitable illumination and protect lamps from accidental contact/breakage. General temporary lights shall have guards unless recessed or otherwise protected.
- Do not suspend temporary lights by electrical cords unless designed for it. Use approved nonconductive supports and protect cords.
- Portable handlamps in wet/conductive locations shall be grounded or double-insulated as permitted and GFCI-protected; use low-voltage/isolated systems when required.

Confined and Enclosed Spaces

- Evaluate electrical equipment in the confined-space assessment. Keep generator exhaust outside and prevent cords/lighting from creating trip, ignition or entanglement hazards.
- Use equipment appropriate for atmospheric classification. Do not introduce non-rated electrical equipment where flammable gas/vapor/dust may be present.
- Metal water tanks and similar enclosures require heightened protection, dry connections and a controlled entry plan.

Pumps and Dewatering

- Use pumps rated for submersion/wet use with intact cords and strain relief. Do not lift by the power cord or enter water to handle energized equipment.
- Deenergize, disconnect and verify before clearing or servicing. Route discharge away from power equipment and access.

Trailers and Heating

- Temporary trailer services require proper feeder/branch wiring, grounding, protection and inspection; portable cords do not replace permanent-type installation.
- Use listed heaters with correct circuit capacity and clearance; no household adapters or damaged/open-element equipment near combustibles.

8. Overhead and Underground Electrical Hazards

Overhead Lines

- Before work, identify line owner, voltage, height/sag and all equipment/material reach. Treat lines as energized unless the utility confirms deenergization and required grounding/protection.
- For ordinary non-crane construction, no employee may work close enough for contact; 10 feet is the baseline for unqualified persons near lines up to 50 kV, with greater distance for higher voltage and conductive objects.
- Cranes/derricks follow 29 CFR 1926 Subpart CC: determine the work zone, confirm voltage, prevent encroachment, hold a planning meeting and use required warning line/barricade/spotter or other measures and Table A clearance.

Equipment and Material Movement

- Account for crane/load line, concrete pump boom, aerial lift, excavator, pile-driving leads, ladders, rebar, screeds, signs and swinging/deflecting loads.
- Use a dedicated spotter when required, with no conflicting duties and effective communication. Nonconductive taglines or insulating links do not make contact safe.
- Lower/secure equipment before travel and use a route plan. Add clearance for uneven ground, wind, poor visibility and line sag.

Underground Utilities

- Contact Wisconsin Diggers Hotline/811 and complete project locate requirements before excavation, drilling, driving posts/piles, coring or penetrating surfaces.
- Preserve marks, identify tolerance zones, use safe potholing methods and obtain private locating where facilities may not be covered by 811.
- Support/protect exposed utilities. Stop for unmarked facilities, damaged markings, unusual conduit/duct, warning tape or changed scope.

Electrical Contact Response

- Operator should remain in the cab unless fire or immediate danger requires escape; warn others away and call the utility/911.
- If escape is necessary, jump clear without touching equipment and ground at the same time, land with feet together and shuffle/hop away. Do not approach until utility confirmation.
- Ground may have step/touch potential. Do not attempt rescue or touch equipment/person until energy is controlled by qualified responders.

9. Deenergizing, Lockout/Tagout and Energized Work

Deenergizing Procedure

- Identify all sources and affected circuits; notify employees; shut down normally; open disconnects/breakers; release/control stored energy; apply each authorized employee's lock and tag under the Hazardous Energy Control policy.
- A qualified person verifies deenergization, including testing the instrument on a known source before and after where applicable. Consider induced voltage and backfeed.
- Ground or discharge stored electrical energy where necessary and protect against reaccumulation.

Tags and Controls

- Controls deactivated during work shall be tagged. Energized circuits/equipment shall be rendered inoperative and tagged at points where they can be energized, unless design prevents this.
- Tags identify circuit/equipment and employee and warn against operation. A tag is a warning device and does not provide the restraint of a lock.
- Only the applying employee normally removes a personal lock; use the documented company exception procedure if unavailable.

Energized Work

- Only qualified persons may work on energized circuits/equipment. Energized work requires documented justification, shock/arc assessment, boundaries, insulated tools, protective shields/barriers and voltage-rated PPE appropriate to the hazard.
- Do not work energized in wet conditions, alone where observation/rescue is necessary, or with inadequate lighting/access/space. Keep unauthorized employees outside boundaries.
- NFPA 70E may guide company energized-work practices but does not replace applicable OSHA requirements.

Reenergization

- Inspect work; remove tools, grounds and protective devices; install covers/guards; clear employees; account for locks/tags; notify affected employees.
- Energize from a safe position using required PPE. Stop for abnormal sound, arc, smoke, trip or response.

Cord-and-Plug Exception

- A personal lock may not be required when unplugging fully controls the hazard and the plug stays under exclusive control of the servicing employee; other stored/mechanical energy still must be controlled.

10. Inspection, Stop Work and Emergency Response

Daily / Pre-Use Verification

- Inspect cords, plugs, tools, GFCIs, panels, covers, enclosures, grounding, routing, weather exposure, working clearance, lighting and housekeeping before use and after changes.
- Confirm source/circuit identity, disconnect access, equipment rating/load, generator condition and utility clearance. Document formal temporary-power and AEGCP inspections.

Periodic and Event Inspections

- A qualified person inspects after installation, relocation, modification, repair, storm/flood, vehicle strike, tripping event, overheating or suspected damage.
- Use manufacturer intervals for GFCIs, generators, distribution equipment and protective devices; maintain instrument calibration/test status.

Remove from Service

- Tag/remove equipment with exposed conductors, missing ground pin, damaged jacket/enclosure, loose/burned plug, failed GFCI, wet internal parts, overheating, smoke, shock/tingle or suspected internal damage.
- Secure defective items against reuse; repair by an authorized person or dispose under company procedure.

Immediate Stop-Work Triggers

- Shock, tingle, arc, fire, smoke, overheating, CO alarm/symptoms or repeated breaker/GFCI trip.
- Missing/failed GFCI or grounding; exposed live parts; open panel; wet/damaged equipment; inadequate approach distance.
- Unknown source/voltage/utility; equipment entering a power-line zone; unqualified electrical work; weather or changed operations defeat controls.

Emergency Actions

- Do not touch a shocked person or energized equipment until power is disconnected or qualified responders confirm safe. Call 911 and guide responders.
- For line contact, keep everyone away, contact utility/911 and consider step/touch potential. After energy control, trained responders provide CPR/AED/first aid.
- Use an appropriate extinguisher only if trained, safe and escape remains available. Never use water on energized equipment.
- Preserve equipment and scene after rescue/control. Report every shock, burn, arc, fire, utility contact and near miss.

Restart

- Correct, inspect/test and rebrief before restart. Never bypass protection, improvise repairs or assume a trip was a nuisance.

11. Training, Records and Program Review

Employee Training

- Before assignment, train employees to recognize electrical hazards, use/test GFCIs, inspect cords/tools, work in wet locations, maintain utility clearance, stop work and respond to contact.
- Employees demonstrate understanding and receive retraining after unsafe performance, incident/near miss, equipment/process change or evidence knowledge is inadequate.

Qualified-Person Training

- Provide training appropriate to voltage, equipment and tasks, including identifying exposed live parts, voltage determination, approach distances, insulated tools/barriers and required PPE.
- Document company authorization and limitations. Experience or an electrician title alone does not define the employee's assigned authority.

Equipment Operators and Spotters

- Train personnel exposed to overhead lines on encroachment prevention, clearance, alarms/signals, contact response and step/touch potential.
- Crane personnel receive Subpart CC power-line training applicable to their roles.

Records

- Maintain temporary-power layouts/approvals, inspections, GFCI/AEGCP tests, qualified-person authorizations, training, utility coordination, equipment repair/test records and incidents/corrective actions.
- Keep current AEGCP records onsite whenever that method is formally used. Retain under company, contract and regulatory schedules.

Coordination and Handoff

- Communicate energized circuits, locked/tagged equipment, routing, restricted areas, defects and incomplete work to the next shift and controlling contractor.
- Toolbox talks supplement, not replace, required qualified-person, operator or task-specific training.

Program Review / Enforcement

- Review at least annually and after regulatory, equipment/process or incident changes. Printed copies are uncontrolled unless formally issued.
- Bypassing GFCIs/guards, removing grounding pins, unauthorized energized work or continuing after stop-work conditions is subject to corrective action.

12. Temporary Power Inspection Checklist

VERIFY	EXPECTATION
Plan / source	Current layout/source, voltage, capacity, disconnect and qualified person verified
Panels / boxes	Listed, closed, guarded, labeled, accessible, stable and weather-suitable
GFCI	Correct equipment protected; TEST/RESET completed; no repeated trips
Grounding	Path intact; no missing pins/adapters; generator configuration verified
Cords / plugs	Entire length inspected; correct rating; no cuts/crush/heat/wet damage
Routing	Protected from traffic, equipment, doors, edges, water, heat and trips
Tools / equipment	Listed/rated; guards/strain relief intact; defects removed
Generator	Outside, ventilated, level, dry, guarded; fuel/exhaust controls acceptable
Wet / outdoor	Correct covers/connectors; distribution elevated/dry; water controlled
Lighting	Adequate, guarded, properly supported and protected
Utilities	Lines identified; clearances/zones/spotters controlled
LOTO / emergency	Shutdown known; locks/tags/status controlled; 911/AED response reviewed

PROJECT: _____	DATE / SHIFT: _____
INSPECTOR: _____	SOURCE / PANEL: _____
DEFICIENCIES / ACTIONS:	

13. Test Your Knowledge

Circle the best answer. Review missed questions with your foreman before using or working near temporary power.

1. What is the company's normal ground-fault method? A. GFCI protection B. Removing the ground pin C. Resetting breakers	2. What follows a failed or repeatedly tripping GFCI? A. Bypass it B. Stop use and have the cause corrected C. Move to an unprotected outlet
3. Who may open or repair energized equipment? A. Any operator B. The nearest worker C. An authorized qualified person	4. What happens to a cord with damaged insulation? A. Remove it from service B. Tape it and continue C. Hide the damage
5. Where should a fuel-burning generator operate? A. Inside a trailer B. Outdoors with safe exhaust clearance C. In a water tank	6. When may a generator backfeed a building through a receptacle? A. During outages B. With a homemade cord C. Never
7. How are overhead lines treated until utility confirmation? A. Energized B. Insulated and safe C. Abandoned	8. What is required before clearing a jammed pump? A. Pull the cord B. Deenergize and control energy C. Stand in water
9. What does repeated breaker tripping indicate? A. Normal operation B. A fault/overload requiring correction C. Install a larger breaker	10. What is the first rule in electrical-contact rescue? A. Grab the person B. Use water C. Do not touch until energy is controlled

EMPLOYEE: _____

DATE: _____

ANSWER KEY: 1-A | 2-B | 3-C | 4-A | 5-B | 6-C | 7-A | 8-B | 9-B | 10-C