



CONSTRUCTION ENVIRONMENTAL HEALTH & SAFETY EXHIBIT

ELECTRICAL SAFETY

I. General Requirements

- A. All electrical work and practices shall comply with OSHA29CFR Part 1926.400 through 1926.449, NFPA 70 – National Electrical Code, NFPA 70E – Standard for Electrical Safety in the Workplace, and 527CMR12.00 – Massachusetts Electrical Code. Where codes/regulations/requirements conflict, the more stringent guideline shall apply. NFPA 70E compliance is required for all contractors with potential exposure to energized electrical equipment, not solely electrical contractors.
All work will take due regard to working near live power transmission and distribution lines and maintain Minimum Approach Distance found in 29CFR 1926.950. Maintain a distance of at least 10 feet from overhead power lines.
- B. Each **Contractor** requiring employees to use or install electrical equipment is required to have an electrical safety program, specific to that **Contractor's** operations, which meets or exceeds the guidelines listed in this Standard. This program shall be part of the **Contractor's** HASP.
- C. The employer's **Competent Person** shall ensure that all **Employees** potentially exposed to electrical hazards possess the knowledge and skill required to perform the duties for which they are assigned. In addition, a hazard analysis shall be completed prior to any operation, any electrical hazards shall be clearly identified, and hazard controls defined. The hazard analysis shall be reviewed with the work crews prior to the start of work, and where conditions change.
- D. Only qualified electricians shall perform work on electrical equipment, systems, or circuits.
- E. Each individual **Contractor** is responsible for the daily inspection, maintenance, and use of portable electric power tools, equipment, extension cords, welding machines, and welding leads.
- F. Electrical equipment shall not be opened/serviced/repaired or otherwise handled until it has been de-energized, locked and tagged out, and verified to conduct zero energy. Verification of zero energy (voltage testing/metering) is considered energized electrical work.
- G. Where work on energized systems is required and necessary, the requirements outlined in Section IV of this Exhibit shall be adhered to. NOTE: It is assumed that it is feasible and practical to isolate, lock, and tag all hazardous energy sources, except those instances where continuity of service is essential to life and health, or where testing of circuits must be performed in the energized state.
- H. Cable tuggers/pullers/winches:
1. All cable tuggers/pullers/winches must be accompanied by the user manual. Operators must have read and understand the manufacturer's requirements outlined in the user manual.
 2. Only persons specifically trained and qualified shall operate cable tuggers/pullers/winches, etc.
 3. All rigging/ropes/chains/anchors, etc. used with cable tuggers/pullers/winches shall be rated to meet or exceed the maximum output force of the equipment being used. All equipment and rigging shall be inspected by the contractor's **Competent Person** prior to each shift. Defective or worn equipment shall not be used.
 4. All cable tugging/pulling/winning areas shall be cordoned off using danger tape and signs, or barricades while in operation to minimize the potential for injury in the event of a mechanical failure/line parting.



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- I. Any connection to or interruption of service of an existing building distribution system requires prior notification to and authorization by the building owner or facility manager. Coordination with and authorization from the building owner or facility manager shall be documented by the **Contractor**.

II. Lighting and Illumination

- A. All construction areas shall be illuminated to the minimum levels outlined in OSHA29CFR Part 1926.56.
- B. Temporary lighting shall not be suspended by its cord, unless it is specifically designed to do so.
- C. All lamps/bulbs for general illumination shall be protected from incidental contact or damage using cages that fully encircle the lamp. Open-bottom protective cages are not allowed.
- D. High intensity discharge (metal halide) fixtures shall be provided with a containment barrier that encloses the lamp, or provided with physical means that allows only Type O lamps.
- E. High intensity discharge fixtures shall be cycled off at least once per week for fifteen minutes or at frequencies prescribed by the manufacturer, whichever is more stringent.
- F. All lighting fixtures, wiring, devices, and equipment subject to dampness or wet locations shall be weatherproof and approved for outdoor use.
- G. All below grade structures shall have, at a minimum, illuminated exit signs (photo-luminescent acceptable)/emergency lighting packs located at each exit stair/ladder, at each level. These signs/emergency lighting packs shall be capable of remaining illuminated during power outages for a period of no less than ninety (90) minutes. These fixtures shall be inspected by the electrical **Contractor** or his designee at least monthly.
- H. All temporary lighting wiring and fixtures must be removed upon completion of the construction.

III. Temporary (Construction Use) Power

- A. Ground Fault Circuit Interrupters (GFCI):
 1. All 125 volt 15, 20, and 30-amp temporary power receptacles shall be protected by a ground fault circuit interrupter (GFCI) at the receptacle.
 2. Receptacles other than 125 volt 15, 20, and 30-amp shall be protected by a GFCI either at the breaker or the receptacle.
 3. Portable electric power units (spider boxes) shall have a GFCI at the unit receptacle, and the cord supplying power from the outlet (or panel if hard wired) shall be SO type. Spider box power cords shall be protected from vehicular and pedestrian traffic, and shall be routed so as not to pose a tripping hazard.
 4. Portable generators shall have GFCI protection at the receptacle.
 5. Permanent power receptacles used during construction shall require the use of a portable GFCI, plugged into the receptacle, or replacement with a GFCI outlet.
 6. The electrical **Contractor** is responsible to inspect all project fixed temporary GFCI receptacles and breakers at least monthly. The inspection shall be documented, and an inspection log shall be maintained. NOTE: A dated/initialed inspection sticker placed on the receptacle or next to the breaker shall be considered to be compliant with this requirement.
- B. Wiring Practices



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1. Underground temporary power feeds shall be in conduit, and the conduit shall be protected, either by encasement in a concrete ductbank or other equally protective means. Direct burial of temporary power feeds, regardless of the wire rating, is not allowed. 'Buried Electric Line' detectable (i.e. metallic) warning tape shall be buried above the ductbank, no closer than twelve inches above the top of the ductbank. If the top of the ductbank is less than two feet below grade, a fixed warning system shall be placed at grade.
 2. Underground temporary power feeds shall be surveyed following installation. The location(s) shall be shown on a site plan or project utility drawing. A copy of this plan/drawing shall be maintained by both the **General Contractor** and the electrical **Contractor**. If the ductbank is to remain following completion of the construction, the exact location shall be shown on the official project as-built drawings, and transmitted to the owner.
 3. All temporary wiring shall be protected from accidental contact or damage either by its placement and its securing method against a wall or deck, or by physical protection (conduit, wood box, etc.). Temporary wiring shall be secured with non-conductive materials unless designed for that purpose.
 4. All receptacles shall be grounded. All metal panels, boxes, covers, conduit, etc. shall be grounded.
 5. Receptacles shall not be installed on branch circuits that supply power to temporary lighting.
 6. All holes, knock-outs, and unused openings in panels, boxes, cabinets, etc., including spaces where circuit breakers are missing, shall be effectively protected with approved covers. Electrical tape or cardboard is not acceptable.
- C. Access, Labeling and Signs
1. Panels shall be locked to prevent unauthorized access. Danger signs shall be placed on the panel door warning project employees of the potential electrical hazard. The sign shall include circuit voltage ratings from the feed side.
 2. Electric vaults, electric/switchgear/transformer rooms/cages/shacks, shall be locked to prevent unauthorized access. Danger signs shall be placed on the panel cover warning project employees of the potential electrical hazard, including voltages present.
 3. Receptacles shall be labeled or marked with permanent marker, showing the panel number/location and the breaker from which the receptacle is powered.
 4. Circuit breakers shall be labeled to show the receptacle/system/tool they control.
 5. Circuit breaker panels shall be labeled to show the voltage they contain, and the location from which power is fed to the panel.
- D. Power Cords and Tools
1. All power tools and extension cords must be grounded, unless double insulated.
 2. All power tools, equipment, and extension cords must be inspected for damage by the user each shift prior to the tool's use. Any tool/equipment/cord found to be damaged shall be tagged and removed from service until repairs have been made, or discarded.
 3. Flexible cords shall not be routed through holes in the floor or wall. Where cords are routed through a door or window, protection shall be provided that prevents damage to the cord.

Flexible cords, including portable electric power unit (spider boxes) cords shall not be run across a walkway, aisle, stair, or ladder entrance. Where it is necessary to cross a walkway, aisle,



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stair, or ladder entrance with a flexible cord, the cord must be suspended at least seven feet above the walking surface.

IV. Energized Electrical Work

Energized electrical work shall comply with the requirements established in NFPA 70-E, Article 130. The Energized Electric Work Permit may be used to satisfy the requirement of Article 130.1(A).

v. Reference

1926.400, Subpart K, Electrical
1926.950, Subpart V, Power Transmission and Distribution
NFPA 70E, Standard for Electrical Safety in the Workplace