<table>
<thead>
<tr>
<th>Examination, installation, and use of equipment -- <strong>1910.303(b)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Examination.</strong> Electric equipment shall be free from recognized hazards that are likely to cause death or serious physical harm to employees, <strong>1910.303(b)(1)</strong>. Safety of equipment shall be determined using the following considerations:</td>
</tr>
<tr>
<td>- Suitability for installation and use in conformity with the provisions of this subpart; <strong>1910.303(b)(1)(i)</strong></td>
</tr>
<tr>
<td>- Mechanical strength and durability, including, for parts designed to enclose and protect other equipment, the adequacy of the protection thus provided; <strong>1910.303(b)(1)(ii)</strong></td>
</tr>
<tr>
<td>- Wire-bending and connection space; <strong>1910.303(b)(1)(iii)</strong></td>
</tr>
<tr>
<td>- Electrical insulation; <strong>1910.303(b)(1)(iv)</strong></td>
</tr>
<tr>
<td>- Heating effects under all conditions of use; <strong>1910.303(b)(1)(v)</strong></td>
</tr>
<tr>
<td>- Arcing effects; <strong>1910.303(b)(1)(vi)</strong></td>
</tr>
<tr>
<td>- Classification by type, size, voltage, current capacity, and specific use; and <strong>1910.303(b)(1)(vii)</strong></td>
</tr>
<tr>
<td>- Other factors that contribute to the practical safeguarding of persons using or likely to come in contact with the equipment. <strong>1910.303(b)(1)(viii)</strong></td>
</tr>
<tr>
<td><strong>Installation and use.</strong> Listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling, <strong>1910.303(b)(2)</strong></td>
</tr>
<tr>
<td><strong>Insulation integrity.</strong> Completed wiring installations shall be free from short circuits and from grounds other than those required or permitted by this subpart, <strong>1910.303(b)(3)</strong></td>
</tr>
<tr>
<td><strong>Mechanical execution of work.</strong> Electric equipment shall be installed in a neat and workmanlike manner. <strong>1910.303(b)(7)</strong></td>
</tr>
<tr>
<td>Unused openings in boxes, raceways, auxiliary gutters, cabinets, equipment cases, or housings shall be effectively closed to afford protection substantially equivalent to the wall of the equipment. <strong>1910.303(b)(7)(i)</strong></td>
</tr>
<tr>
<td>Conductor shall be racked to provide ready and safe access in underground and subsurface enclosures that persons enter for installation and maintenance. <strong>1910.303(b)(7)(ii)</strong></td>
</tr>
<tr>
<td>Internal parts of electrical equipment, including busbars, wiring terminals, insulators, and other surfaces, may not be damaged or contaminated by foreign materials such as paint, plaster, cleaners, abrasives, or corrosive residues. <strong>1910.303(b)(7)(iii)</strong></td>
</tr>
<tr>
<td>There shall be no damaged parts that may adversely affect safe operation or mechanical strength of the equipment, such as parts that are broken, bent, cut, or deteriorated by corrosion, chemical action, or overheating. <strong>1910.303(b)(7)(iv)</strong></td>
</tr>
<tr>
<td><strong>Mounting and cooling of equipment.</strong> <strong>1910.303(b)(8)</strong></td>
</tr>
<tr>
<td>Electric equipment shall be firmly secured to the surface on which it is mounted. <strong>1910.303(b)(8)(i)</strong></td>
</tr>
<tr>
<td><strong>Note to paragraph (b)(8)(i) of this section:</strong> Wooden plugs driven into holes in masonry, concrete, plaster, or similar materials are not considered secure means of fastening electric equipment.</td>
</tr>
<tr>
<td>Electric equipment that depends on the natural circulation of air and convection principles for cooling of exposed surfaces shall be installed so that room airflow over such surfaces is not prevented by walls or by adjacent installed equipment. For equipment designed for floor mounting, clearance between top surfaces and adjacent surfaces shall be provided to dissipate rising warm air. <strong>1910.303(b)(8)(ii)</strong></td>
</tr>
</tbody>
</table>

**NLBMDA 1910.303 General Electrical Checklist**

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**Electric equipment provided with ventilating openings shall be installed so that walls or other obstructions do not prevent the free circulation of air through the equipment.**

**Terminals. 1910.303(c)(2)**

Connection of conductors to terminal parts shall ensure a good connection without damaging the conductors and shall be made by means of pressure connectors (including set-screw type), solder lugs, or splices to flexible leads. However, No. 10 or smaller conductors may be connected by means of wire binding screws or studs and nuts having upturned lugs or equivalent.

**Marking – 1910.303(e)**

**Identification of manufacturer and ratings.** Electric equipment may not be used unless the following markings have been placed on the equipment:

- The manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product may be identified; and
- Other markings giving voltage, current, wattage, or other ratings as necessary.

**Durability.** The marking shall be of sufficient durability to withstand the environment involved.

**Disconnecting means and circuits – 1910.303(f)**

**Motors and appliances.** Each disconnecting means required by this subpart for motors and appliances shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.

**Services, feeders, and branch circuits.** Each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.

**Durability of markings.** The markings required by paragraphs (f)(1) and (f)(2) of this section shall be of sufficient durability to withstand the environment involved.

**Capable of accepting a lock.** Disconnecting means required by this subpart shall be capable of being locked in the open position.

**600 Volts, nominal, or less.** This paragraph applies to electrical equipment operating at 600 volts, nominal, or less to ground.

**Space about electric equipment.** Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment.

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working space for equipment likely to require examination, adjustment, servicing, or maintenance while energized shall comply with the following dimensions, except as required or permitted elsewhere in this subpart:</td>
<td>1910.303(g)(1)</td>
</tr>
<tr>
<td>• The depth of the working space in the direction of access to live parts may not be less than indicated in Table S-1. Distances shall be measured from the live parts if they are exposed or from the enclosure front or opening if they are enclosed;</td>
<td>1910.303(g)(1)(i)(A) ###############################################################################</td>
</tr>
<tr>
<td>• The width of working space in front of the electric equipment shall be the width of the equipment or 762 mm (30 in.), whichever is greater. In all cases, the working space shall permit at least a 90-degree opening of equipment doors or hinged panels; and</td>
<td>1910.303(g)(1)(i)(B) #############################################################################</td>
</tr>
<tr>
<td>• The work space shall be clear and extend from the grade, floor, or platform to the height required by paragraph (g)(1)(vi) of this section. However, other equipment associated with the electrical installation and located above or below the electric equipment may extend not more than 153 mm (6 in.) beyond the front of the electric equipment.</td>
<td>1910.303(g)(1)(i)(C) ##############################################################################</td>
</tr>
</tbody>
</table>

**Working space required by this standard may not be used for storage.** When normally
enclosed live parts are exposed for inspection or servicing, the working space, if in a passageway or general open space, shall be suitably guarded. 1910.303(g)(1)(ii)

At least one entrance of sufficient area shall be provided to give access to the working space about electric equipment. 1910.303(g)(1)(iii)

For equipment rated 1200 amperes or more and over 1.83 m (6.0 ft) wide, containing overcurrent devices, switching devices, or control devices, there shall be one entrance not less than 610 mm (24 in.) wide and 1.98 m (6.5 ft) high at each end of the working space, except that: 1910.303(g)(1)(iv)

- Where the location permits a continuous and unobstructed way of exit travel, one means of exit is permitted; or 1910.303(g)(1)(iv)(A)

- Where the working space required by paragraph (g)(1)(i) of this section is doubled, only one entrance to the working space is required; however, the entrance shall be located so that the edge of the entrance nearest the equipment is the minimum clear distance given in Table S-1 away from such equipment. 1910.303(g)(1)(iv)(B)

Illumination shall be provided for all working spaces about service equipment, switchboards, panelboards, and motor control centers installed indoors. Additional lighting fixtures are not required where the working space is illuminated by an adjacent light source. In electric equipment rooms, the illumination may not be controlled by automatic means only. 1910.303(g)(1)(v)

The minimum headroom of working spaces about service equipment, switchboards, panelboards, or motor control centers shall be as follows: 1910.303(g)(1)(vi)

- For installations built before August 13, 2007, 1.91 m (6.25 ft); 1910.303(g)(1)(vi)(A)

- For installations built on or after August 13, 2007, 1.98 m (6.5 ft), except that where the electrical equipment exceeds 1.98 m (6.5 ft) in height, the minimum headroom may not be less than the height of the equipment. 1910.303(g)(1)(vi)(B)

Switchboards, panelboards, and distribution boards installed for the control of light and power circuits, and motor control centers shall be located in dedicated spaces and protected from damage. 1910.303(g)(1)(vii)

For Indoor installations -

For indoor installation, the dedicated space shall comply with the following: 1910.303(g)(1)(vii)(A)

**Note to paragraph (g)(1)(vii)(A) of this section:** A dropped, suspended, or similar ceiling that does not add strength to the building structure is not considered a structural ceiling.

- The space equal to the width and depth of the equipment and extending from the floor to a height of 1.83 m (6.0 ft) above the equipment or to the structural ceiling, whichever is lower, shall be dedicated to the electrical installation. Unless isolated from equipment by height or physical enclosures or covers that will afford adequate mechanical protection from vehicular traffic or accidental contact by unauthorized personnel or that complies with paragraph (g)(1)(vii)(A)(2) of this section, piping, ducts, or equipment foreign to the electrical installation may not be located in this area; 1910.303(g)(1)(vii)(A)(1)

- The space equal to the width and depth of the equipment shall be kept clear of foreign systems unless protection is provided to avoid damage from condensation, leaks, or breaks in such foreign systems. This area shall extend from the top of the electric equipment to the structural ceiling; 1910.303(g)(1)(vii)(A)(2)

- Sprinkler protection is permitted for the dedicated space where the piping complies with this section; and 1910.303(g)(1)(vii)(A)(3)

- Control equipment that by its very nature or because of other requirements in this subpart must be adjacent to or within sight of its operating machinery is permitted in
the dedicated space. 1910.303(g)(1)(vii)(A)(4)

For Outdoor Installations –

Outdoor electric equipment shall be installed in suitable enclosures and shall be protected from accidental contact by unauthorized personnel, or by vehicular traffic, or by accidental spillage or leakage from piping systems. No architectural appurtenance or other equipment may be located in the working space required by paragraph (g)(1)(i) of this section. 1910.303(g)(1)(vii)(B)

Guarding of live parts. 1910.303(g)(2)

Except as elsewhere required or permitted by this standard, live parts of electric equipment operating at 50 volts or more shall be guarded against accidental contact by use of approved cabinets or other forms of approved enclosures or by any of the following means: 1910.303(g)(2)(i)

- By location in a room, vault, or similar enclosure that is accessible only to qualified persons; 1910.303(g)(2)(i)(A)

- By suitable permanent, substantial partitions or screens so arranged so that only qualified persons will have access to the space within reach of the live parts. Any openings in such partitions or screens shall be so sized and located that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them; 1910.303(g)(2)(i)(B)

- By placement on a suitable balcony, gallery, or platform so elevated and otherwise located as to prevent access by unqualified persons; or 1910.303(g)(2)(i)(C)

- By elevation of 2.44 m (8.0 ft) or more above the floor or other working surface. 1910.303(g)(2)(i)(D)

In locations where electric equipment is likely to be exposed to physical damage, enclosures or guards shall be so arranged and of such strength as to prevent such damage. 1910.303(g)(2)(ii)

Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter. 1910.303(g)(2)(iii)

**Notes (Other Hazards Observed, Unsafe Acts Observed, Possible Corrective Action, Recordkeeping Requirements):**

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________
Table S-1. -- Minimum Depth of Clear Working Space at Electric Equipment, 600 V or Less

| Nominal voltage to ground | Minimum clear distance for condition \( ^2 \) \(^3 \) | | | | | | | | Condition A | Condition B | Condition C | | | | | | m | ft | m | ft | m | ft | m | ft |
|---------------------------|-------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-150                     | \( ^0.9 \)                                       | \( ^1.3 \) | \( ^0.9 \) | \( ^1.0 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^1.0 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) |
| 151-600                   | \( ^0.9 \)                                       | \( ^1.3 \) | \( ^0.9 \) | \( ^1.0 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^1.0 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) | \( ^0.9 \) | \( ^3.0 \) |

Notes to Table S-1:

1. Minimum clear distances may be 0.7 m (2.5 ft) for installations built before April 16, 1981.
2. Conditions A, B, and C are as follows:
   Condition A -- Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by suitable wood or other insulating material. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts.
   Condition B -- Exposed live parts on one side and grounded parts on the other side.
   Condition C -- Exposed live parts on both sides of the work space (not guarded as provided in Condition A) with the operator between.
3. Working space is not required in back of assemblies such as dead-front switchboards or motor control centers where there are no renewable or adjustable parts (such as fuses or switches) on the back and where all connections are accessible from locations other than the back. Where rear access is required to work on deenergized parts on the back of enclosed equipment, a minimum working space of 762 mm (30 in.) horizontally shall be provided.

Definitions

Acceptable. An installation or equipment is acceptable to the Assistant Secretary of Labor, and approved within the meaning of this Subpart S:

(1) If it is accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory recognized pursuant to § 1910.7; or

(2) With respect to an installation or equipment of a kind that no nationally recognized testing laboratory accepts,certifies, lists, labels, or determines to be safe, if it is inspected or tested by another Federal agency, or by a State, municipal, or other local authority responsible for enforcing occupational safety provisions of the National Electrical Code, and found in compliance with the provisions of the National Electrical Code as applied in this subpart; or

(3) With respect to custom-made equipment or related installations that are designed, fabricated for, and intended for use by a particular customer, if it is determined to be safe for its intended use by its manufacturer on the basis of test data which the employer keeps and makes available for inspection to the Assistant Secretary and his authorized representatives.

Accessible. (As applied to wiring methods.) Capable of being removed or exposed without damaging the building structure or finish, or not permanently closed in by the structure or finish of the building. (See “concealed” and “exposed.”)
Accessible. (As applied to equipment.) Admitting close approach; not guarded by locked doors, elevation, or other effective means. (See "Readily accessible.")

Approved. Acceptable to the authority enforcing this subpart. The authority enforcing this subpart is the Assistant Secretary of Labor for Occupational Safety and Health. The definition of "acceptable" indicates what is acceptable to the Assistant Secretary of Labor, and therefore approved within the meaning of this subpart.

Branch circuit. The circuit conductors between the final overcurrent device protecting the circuit and the outlets.

Cable tray system. A unit or assembly of units or sections and associated fittings forming a rigid structural system used to securely fasten or support cables and raceways. Cable tray systems include ladders, troughs, channels, solid bottom trays, and other similar structures.

Controller. A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected.

Enclosed. Surrounded by a case, housing, fence, or walls that will prevent persons from accidentally contacting energized parts.

Enclosure. The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage.

Energized. Electrically connected to a source of potential difference.

Equipment. A general term including material, fittings, devices, appliances, fixtures, apparatus, and the like, used as a part of, or in connection with, an electrical installation.

Exposed. (As applied to live parts.) Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts not suitably guarded, isolated, or insulated. (See Accessible and Concealed.)

Exposed. (As applied to wiring methods.) On or attached to the surface, or behind panels designed to allow access. (See Accessible. (As applied to wiring methods.))

Guarded. Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach to a point of danger or contact by persons or objects.

Live parts. Energized conductive components.

Location --

(1) Damp location. Partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold-storage warehouses.

(2) Dry location. A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.
(3) **Wet location.** Installations underground or in concrete slabs or masonry in direct contact with the earth, and locations subject to saturation with water or other liquids, such as vehicle-washing areas, and locations unprotected and exposed to weather.

*Panelboard.* A single panel or group of panel units designed for assembly in the form of a single panel; including buses, automatic overcurrent devices, and with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall or partition and accessible only from the front. (See Switchboard.)

*Power outlet.* An enclosed assembly, which may include receptacles, circuit breakers, fuseholders, fused switches, buses, and watt-hour meter mounting means, that is intended to supply and control power to mobile homes, recreational vehicles, or boats or to serve as a means for distributing power needed to operate mobile or temporarily installed equipment.

*Qualified person.* One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazards involved.

*Readily accessible.* Capable of being reached quickly for operation, renewal, or inspections, so that those needing ready access do not have to climb over or remove obstacles or to resort to portable ladders, chairs, etc. (See Accessible.)

*Receptacle.* A receptacle is a contact device installed at the outlet for the connection of an attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is two or more contact devices on the same yoke.

*Receptacle outlet.* An outlet where one or more receptacles are installed.

*Switchboard.* A large single panel, frame, or assembly of panels on which are mounted, on the face or back, or both, switches, overcurrent and other protective devices, buses, and (usually) instruments. Switchboards are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets. (See Panelboard.)

*Watertight.* So constructed that moisture will not enter the enclosure.

*Weatherproof.* So constructed or protected that exposure to the weather will not interfere with successful operation. Rainproof, raintight, or watertight equipment can fulfill the requirements for weatherproof where varying weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

*Wireways.* Sheet-metal troughs with hinged or removable covers for housing and protecting electric wires and cable and in which conductors are laid in place after the wireway has been installed as a complete system.

***

* OSHA Standard 1910.303 addresses General Electrical considerations as one of several parts of 1910 Subpart S, Electrical. Subpart S is organized around general electrical requirements, wiring design and protection, wiring methods, components and equipment for general usage, as well as specific purpose equipment, hazardous locations, and special systems. Subpart S also addresses training, selection and use of work practices, use of equipment, and safeguards for personal protection.
** This checklist does not include every element of OSHA Standard 1910.303 – General Electrical. The following sections of 1910.303 are not included in this checklist:

1910.303(b)(4) Interrupting rating. 1910.303(b)(5) Circuit impedance and other characteristics
1910.303(b)(6) Deteriorating agents
1910.303(c) Electrical connections
1910.303(c)(3) Splices
1910.303(d) Arcing parts
1910.303(f)(5) Marking for series combination ratings
1910.303(h) Over 600 volts, nominal