

## **Guidance for Electrical Equipment Inspection**

Refer to the National Electrical Code for definitions and further requirements.

Number in parenthesis is section of Code referenced.

1. Examination - In judging equipment, considerations such as the following shall be evaluated: (110.3)
  - a. Suitability for installation and use in conformity with the provisions of this Code
    - i. Suitability of equipment use may be identified by a description marked on or provided with a product to identify the suitability of the product for a specific purpose, environment, or application. Suitability of equipment may be evidenced by listing or labeling.
    - ii. In damp or wet locations equipment shall be placed or equipped so as to prevent moisture or water from entering and accumulating within the equipment, and shall be mounted so there is at least 6-mm ( 1/4-in.) airspace between the enclosure and the wall or other supporting surface. Enclosures installed in wet locations shall be weatherproof. (312.2(A))
  - b. Mechanical strength and durability, including, for parts designed to enclose and protect other equipment, the adequacy of the protection thus provided. Metal enclosures shall be protected both inside and outside against corrosion.(312.10(A))
  - c. Wire-bending and connection space
  - d. Space in enclosure shall be sufficient to accommodate all conductors installed in them without crowding.(312.7)
  - e. Electrical insulation
  - f. Heating effects under normal conditions of use and also under abnormal conditions likely to arise in service
  - g. Arcing effects
  - h. Classification by type, size, voltage, current capacity, and specific use
  - i. Openings through which conductors enter shall be adequately closed.
  - j. Other factors that contribute to the practical safeguarding of persons using or likely to come in contact with the equipment
2. Mechanical Execution of Work (110.12)
  - a. Electrical equipment shall be installed in a neat and workmanlike manner.
3. Grounding of Electrical Equipment (250.4(A))
  - a. Non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected to earth so as to limit the voltage to ground on these materials.
  - b. Sheet metal screws shall not be used to connect grounding conductors or connection devices to enclosures (250.8)
  - c. Terminals for equipment grounding conductors shall be a distinctive green color or otherwise identified. (250.126)
4. Bonding of Electrical Equipment (250.4(A))

- a. Non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path.
  - b. Bonding of Electrically Conductive Materials and Other Equipment - Electrically conductive materials that are likely to become energized shall be connected together and to the supply system grounded equipment in a manner that creates a permanent, low-impedance path for ground-fault current that is capable of carrying the maximum fault current likely to be imposed on it.
- 5. Strength (312.10(B))
  - a. The design and construction of enclosures shall be such as to secure ample strength and rigidity. If constructed of sheet steel, the metal thickness shall not be less than 1.35 mm (0.053 in.) uncoated.
- 6. Spacing (312.11)
  - a. Spacing within cabinets and cutout boxes shall be sufficient to provide ample room for the distribution of wires and cables placed in them and for a separation between metal parts of devices and apparatus mounted within them as follows.
    - i. Base- Other than at points of support, there shall be an airspace of at least 1.59 mm (0.0625 in.) between the base of the device and the wall of any metal cabinet or cutout box in which the device is mounted.
    - ii. Doors -There shall be an airspace of at least 25.4 mm (1.00 in.) between any live metal part, including live metal parts of enclosed fuses, and the door.
    - iii. Live Parts -There shall be an airspace of at least 12.7 mm (0.500 in.) between the walls, back, gutter partition, if of metal, or door of any cabinet or cutout box and the nearest exposed current-carrying part of devices mounted within the cabinet where the voltage does not exceed 250. This spacing shall be increased to at least 25.4 mm (1.00 in.) for voltages of 251 to 600, nominal.
    - iv. Switch Clearance -Cabinets and cutout boxes shall be deep enough to allow the closing of the doors when 30-ampere branch-circuit panelboard switches are in any position, when combination cutout switches are in any position, or when other single-throw switches are opened as far as their construction permits.
- 7. Overcurrent Protection
  - a. Conductors, other than flexible cords, flexible cables, and fixture wires, shall be protected against overcurrent in accordance with their ampacities specified in NEC 310.15.
  - b. Branch Circuit Overcurrent Device
    - i. Supply Cord of Listed Appliance shall be considered to be protected when applied within the appliance or portable lamp listing requirements.
    - ii. Fixture Wire

1. Fixture wire shall be permitted to be tapped to the branch circuit conductor of a branch circuit in accordance with the following:
  - a. 20-ampere circuits — 18 AWG, up to 15 m (50 ft) of run length
  - b. 20-ampere circuits — 16 AWG, up to 30 m (100 ft) of run length
  - c. 20-ampere circuits — 14 AWG and larger
  - d. 30-ampere circuits — 14 AWG and larger
  - e. 40-ampere circuits — 12 AWG and larger
- iii. Extension Cord Sets -Flexible cord used in listed extension cord sets shall be considered to be protected when applied within the extension cord listing requirements.
- iv. Field Assembled Cord Sets -Flexible cord used in extension cords made with separately listed and installed components shall be permitted to be supplied by a branch circuit in accordance with the following:
  1. 20-ampere circuits — 16 AWG and larger