

Chapter E 320

OPEN WIRING ON INSULATORS

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E 320.01 Definition. Open wiring is a wiring method using cleats, knobs, tubes and flexible tubing for the protection and support of insulated conductors run in or on buildings, and not concealed by the building structure.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.02 Use. (1) Open wiring on insulators may be used for exposed work, either inside or outside building; in dry or wet locations; where subject to corrosive vapors such as covered by chapter E 480; for services as covered by chapter E 230, provided the requirements of this chapter are satisfied.

(2) Open wiring on insulators shall not be used (a) in commercial garages, (b) in theaters, (c) in motion-picture studios, (d) in hoistways, and (e) in hazardous locations, except in storage compartments of class III locations as provided in subsection E 503.03 (2).

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.03 Other chapters. In addition to the provisions of this chapter, open wiring shall conform to the other applicable provisions of this code. See especially chapters E 300 and E 730.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.04 Conductors. The type of conductors shall conform to chapter E 310. Only single conductors shall be used.

(1) The allowable current-carrying capacities of insulated conductors as shown in tables E 310.13 and E 310.15 shall apply to open wiring on insulators.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.05 Supports. (1) Conductors shall not be in contact with any object other than their insulating supports. They shall be rigidly supported on noncombustible, non-absorptive insulating material as follows:

(a) Under ordinary circumstances, supports for wiring over flat surfaces shall be not more than 4½ feet apart. Where the conductors are likely to be disturbed, the distance between supports shall be shortened sufficiently to provide adequate support for conductors;

- (b) Conductors shall be supported within 6 inches of a tap;
- (c) Conductors shall not be dead ended at a rosette, lampholder, or receptacle unless the last support is within 12 inches of the device.

(2) The following exceptions to the provisions of subsection E 320.05 (1) may be permitted:

(a) *Exception No. 1.* For use of non-metallic flexible tubing, see section E 320.07.

(b) *Exception No. 2.* Conductors of No. 8 or larger installed in the open, across open spaces where not likely to be disturbed, may be supported at distances not greater than 15 feet provided that approved noncombustible, non-absorptive insulating separators assuring not less than 2½ inch separation between conductors, are installed at intervals of not over 4½ feet.

(c) *Exception No. 3.* In buildings of mill construction where not likely to be disturbed, feeders in the open, not smaller than No. 8, may be separated about 6 inches and installed direct from timber to timber, being supported from each timber only.

(3) When nails are used to mount knobs they shall not be smaller than 10 penny. When screws are used to mount knobs, or when nails or screws are used to mount cleats, they shall be of a length sufficient to penetrate the wood to a depth equal to at least one-half the height of the knob and fully the thickness of the cleat. Cushion washers shall be used with nails.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.06 Conductor separation. Open conductors shall be separated as follows:

(1) For voltage not exceeding 300 volts between conductors, 2½ inches from each other and shall be separated from the surface wired over at least ½ inch in dry locations.

(2) For voltages of 301 to 600 volts between conductors, 4 inches from each other and shall be separated from surface wired over at least 1 inch.

(3) In damp or wet locations, a separation of at least 1 inch from the surface wired over shall be maintained for all voltages.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.07 Flexible non-metallic tubing. In dry locations, when not exposed to severe physical damage, conductors may be separately encased in flexible tubing. Tubing shall be in continuous length not exceeding 15 feet, and secured to the surface wired over by straps spaced not exceeding 4½ feet apart.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.08 Tie wires. No. 8 or larger conductors supported on solid knobs shall be securely tied thereto. Tie wires shall have a covering equivalent to conductors which they confine.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.09 Passing through walls and floors. Open conductors shall be separated from contact with walls, floors, timbers or partitions through which they pass by tubes or bushings of noncombustible, non-absorptive insulating material. Where the bushing is shorter than the hole, a waterproof sleeve of non-inductive material shall be inserted in the

hole and an insulating bushing slipped into the sleeve at either end in such a manner as to keep the conductors absolutely out of contact with the sleeve. Each conductor must be carried through a separate tube or sleeve.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.10 Separation from metal work. Open conductors shall be separated at least 2 inches from metallic conduit, piping, or other conducting material, and from any exposed lighting, power or signal conductor, or shall be separated therefrom by a continuous and firmly fixed non-conductor additional to the insulation of the conductor. Where any insulating tube is used, it shall be secured at the ends. Deviation from this requirement may, when necessary, be allowed by the administrative authority.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.11 Separation from piping in damp locations. Open conductors located close to water pipes or tanks, or in other damp locations, shall be so placed that an air space will be permanently maintained between them and pipes which they cross. Where practicable, conductors shall be installed over, rather than under, pipes upon which moisture is likely to gather or which may leak.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.12 Protection from physical damage. Where open conductors cross ceiling joists and wall studs, and are exposed to physical damage, they shall be protected by one of the following methods. Conductors within 8 feet from the floor shall be considered exposed to physical damage.

(1) By guard strips not less than $\frac{3}{8}$ inch in thickness and at least as high as the insulating supports, placed on each side of and close to the wiring.

(2) By a substantial running board at least $\frac{1}{2}$ inch thick back of the conductors with side protections. Running boards shall extend at least 1 inch outside the conductors, but not more than 2 inches and the protecting sides shall be at least 2 inches high and at least $\frac{3}{8}$ inch thick.

(3) By boxing made as above and furnished with cover kept at least 1 inch away from the conductors within. Where protecting vertical conductors on side walls the boxing shall be closed at the top and the holes through which the conductors pass shall be bushed.

(4) By rigid metal conduit or electrical metallic tubing, in which case the rules of chapter E 346 or E 348 shall apply; or by metal piping, in which case the conductors shall be encased in continuous lengths of approved flexible tubing. The conductors passing through metal enclosures shall be so grouped that current in both directions is approximately equal.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.13 In accessible attics. Conductors in unfinished attics or roof spaces shall be installed in accordance with the provisions of section E 324.08.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.14 Entering spaces subject to dampness, wetness or corrosive vapors. Conductors entering or leaving locations subject to dampness,

wetness or corrosive vapors shall have drip loops formed on them and shall then pass upward and inward from the outside of buildings, or from the damp, wet, or corrosive location, through noncombustible, non-absorptive insulating tubes. See also sections E 230.049 and E 730.21.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.

E 320.15 Switches. (1) Surface-type snap switches shall be mounted in accordance with the provisions of section E 380.10. Metal boxes are not required. See section E 380.03.

(2) Other types of switches shall be installed in accordance with the provisions of section E 380.03.

History: Cr. Register, April, 1964, No. 100, eff. 5-1-64.