

Chapter E 334

METAL-CLAD CABLE

Type MC and AC Series

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E 334.01 Definition. A metal-clad cable is a fabricated assembly of insulated conductors and one or more adequate grounding conductors in a flexible metallic enclosure. See section E 334.04.

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

E 334.02 Voltage. See section E 300.02. For systems in excess of 600 volts see chapter E 710.

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

E 334.03 Marking. The provisions of section E 310.02 shall apply, except that AC cable shall have ready identification of the maker by distinctive external markers in the cable sheath throughout its entire length.

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

E 334.04 Construction. Metal-clad cable shall be an approved cable of type MC or AC series, with acceptable metal covering. The insulated conductors shall conform with section E 334.05.

(1) **TYPE MC.** Type MC cables are power cables limited in size, for the voltages of this chapter, to conductors of No. 4 AWG and larger for copper and No. 2 AWG and larger for aluminum. The metal enclosures shall be either a covering of interlocking metal tape, or an impervious, close fitting, corrugated tube. Supplemental protection of an outer covering of corrosion-resistant material shall be required where such protection is needed. See section E 300.05. One or more grounding conductors shall be incorporated under the metallic covering. The total cross-section of the grounding conductor shall be approximately equal to one-half the cross-section of one phase conductor.

(2) **TYPE AC.** Type AC cables are branch circuit and feeder cables with armor of flexible metal tape. Cables of the AC type, except ACL, shall have an internal bonding strip of copper or aluminum, in intimate contact with the armor for its entire length.

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

E 334.05 Conductors. Conductors for metal-clad cable shall conform with the following:

(1) **TYPE MC.** For cables of type MC, insulated conductors shall be of a type listed in table E 310.02(2) for rubber, thermoplastic, varnished cloth, asbestos-varnished cloth, or of a type especially approved for the purpose.

(2) **TYPE AC.** For cables of type AC, insulated conductors shall be of a type listed in table E 310.02(2). In addition, the conductors shall have an overall moisture-resistant and fire-retardant fibrous covering; for type ACT, a moisture-resistant fibrous covering is required only on the individual conductors.

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

E 334.06 Use. Except where otherwise specified elsewhere in this code, and where not subject to physical damage, metal-clad cable may be installed for branch circuits and feeders in both exposed and concealed work as follows:

(1) **TYPE MC.** This type of power cable may be used in partially protected areas, such as in continuous rigid cable supports and the like, in dry locations and when any of the following conditions are met it may be used in wet locations:

(a) The metallic covering is impervious to moisture.

(b) A lead sheath or moisture impervious jacket is provided under the metal covering.

(c) The insulated conductors under the metallic covering are approved for use in wet locations.

Note: See section E 300.05.

(2) **TYPE AC.** Metal-clad cable of the AC type may be used in dry locations; for underplaster extensions as provided in chapter E 344; and embedded in plaster finish on brick or other masonry, except in damp or wet locations. This cable may be run or fished in the air voids of masonry block or tile walls; where such walls are exposed or subject to excessive moisture or dampness or are below grade line, type ACL cable shall be used. This cable shall contain lead-covered conductors (type ACL), if used where exposed to the weather or to continuous moisture, for underground runs and embedded in masonry, concrete or fill in buildings in course of construction, or where exposed to oil, or other conditions having a deteriorating effect on the insulation. Type AC metal-clad cable shall not be used where prohibited elsewhere in this code, including (a) in theatres, except as provided in section E 520.04; (b) in motion-picture studios; (c) in any hazardous locations; (d) where exposed to corrosive fumes or vapors; (e) on cranes or hoists, except as provided in section E 610.11 Exception No. 3; (f) in storage battery rooms; or (g) commercial garages where prohibited in chapter E 511.

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

E 334.07 Other chapters. In addition to the provisions of this chapter, metal-clad cable shall conform to other applicable provisions of this code. See especially chapter E 300.

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

E 334.08 Supports. Metal-clad cable shall be secured by approved staples, straps, hangers or similar fittings so designed and installed as not to injure the cable.

(1) Type MC cable shall be secured at intervals not exceeding 6 feet, and within 2 feet from every box or fitting, except where cable is fished. Cable may be installed on metal racks, trays, troughs, or continuous rigid cable supports, grounded as required by chapter E 250. The cables shall be separated from each other by a distance of not less than $\frac{1}{4}$ of a cable diameter. There shall be no more than one layer of cables on a rack or other support member; each cable so installed shall be supported at intervals not exceeding 6 feet and within 2 feet from every box or fitting, and each cable shall be attached to the support at intervals of not more than 10 feet horizontally and 2 feet vertically.

(2) Type AC cable shall be secured at intervals of not exceeding $4\frac{1}{2}$ feet and within 12 inches from every outlet box or fitting, except where cable is fished and except lengths of not over 24 inches at terminals where flexibility is necessary.

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

E 334.09 Bends. All bends shall be so made that the cable will not be injured, and the radius of the curve of the inner edge of any bend shall not be less than 7 times the diameter of type MC cable nor 5 times the diameter of type AC cable.

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

E 334.10 Boxes and fittings. (1) At all points where type MC metal-clad cable terminates, suitable fittings designed for use with the particular wiring cable and the conditions of service, shall be used.

(2) At all points where the armor of AC cable terminates, a fitting shall be provided to protect wires from abrasion, unless the design of the outlet boxes or fittings is such as to afford equivalent protection, and in addition, an approved insulating bushing or its equivalent approved protection shall be provided between the conductors and the armor. The connector or clamp by which the armored cable is fastened to boxes or cabinets shall be of such design that the insulating bushing or its equivalent will be visible for inspection. This bushing is not required with lead-covered cables which will be so installed that the lead sheath will be visible for inspection. Where change is made from armored cable to other cable or raceway wiring methods, a box shall be installed at junction point as required in section E 300.15.

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

E 334.11 Through studs, joists and rafters. See section E 300.08.

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

E 334.12 Exposed work. Exposed runs of cable shall closely follow the surface of the building finish or of running boards, except:

(1) Lengths of not more than 24 inches at terminals where flexibility is necessary.

(2) Where suitably supported in accordance with section E 334.08(1).

(3) On the underside of floor joists in basements where supported at each joist and so located as not to be subject to physical damage.

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

E 334.13 In accessible attics. Type AC cables in accessible attics or roof spaces shall be installed as follows:

(1) Where run across the top of floor joists, or within 7 feet of floor or floor joists across the face of rafters or studding, in attics and roof spaces which are accessible, the cable shall be protected by substantial guard strips which are at least as high as the cable. Where this space is not accessible by permanent stairs or ladders, protection will only be required within 6 feet of the nearest edge of scuttle hole or attic entrance.

(2) Where cable is carried along the sides of rafters, studs or floor joists, neither guard strips nor running boards shall be required.

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