**(D) Physical Protection.** Bonding conductors and grounding electrode conductors shall be protected where exposed to physical damage. Where the bonding conductor or grounding electrode conductor is installed in a metal raceway, both ends of the raceway shall be bonded to the contained conductor or to the same terminal or electrode to which the bonding conductor or grounding electrode conductor is connected.

Where metal raceways are used to enclose the grounding electrode conductor (GEC), a connection between the GEC and the metal conduit must be provided at both ends of the conduit to ensure an adequate low-impedance current path to ground.

**See also**

**250.64(E),** which covers raceways, cable armor, and enclosures for GECs

**(E) Run in Straight Line.** The bonding conductor or grounding electrode conductor for an antenna mast or antenna discharge unit shall be run in as straight a line as practicable.

**(F) Electrode.** The bonding conductor or grounding electrode conductor shall be connected as required in 810.21(F)(1) through 810.21(F)(3).

**(1) In Buildings or Structures with an Intersystem Bonding Termination.** If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor shall be connected to the intersystem bonding termination.

Δ **(2) In Buildings or Structures with Grounding Means.** If the building or structure served has no intersystem bonding termination, the bonding conductor or grounding electrode conductor shall be connected to the nearest accessible location on one of the following:

(1) The building or structure grounding electrode system as covered in 250.50
(2) The power service accessible means external to the building, as covered in 250.94
(3) The nonflexible metal power service raceway
(4) The service equipment enclosure
(5) The grounding electrode conductor or the grounding electrode conductor metal enclosures of the power service
(6) The grounded interior metal water piping systems, within 1.52 m (5 ft) from its point of entrance to the building, as covered in 250.52

**See also**

**250.52(A)(1)** for more information on the use of a metal water piping system

**250.68(C)** for more information on connections to GEC connections

A bonding device intended to provide a termination point for the bonding conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on nonremovable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is nonremovable.

**(3) In Buildings or Structures Without an Intersystem Bonding Termination or Grounding Means.** If the building or structure served has no intersystem bonding termination or grounding means as described in 810.21(F)(2), the grounding electrode conductor shall be connected to a grounding electrode as described in 250.52.

**(G) Inside or Outside Building.** The bonding conductor or grounding electrode conductor shall be permitted to be run either inside or outside the building.

**(H) Size.** The bonding conductor or grounding electrode conductor shall not be smaller than 10 AWG copper, 8 AWG aluminum, or 17 AWG copper-clad steel or bronze.

**(I) Common Ground.** A single bonding conductor or grounding electrode conductor shall be permitted for both protective and operating purposes.

**(J) Bonding of Electrodes.** A bonding jumper not smaller than 6 AWG copper or equivalent shall be connected between the radio and television equipment grounding electrode and the power grounding electrode system at the building or structure served if separate electrodes are used.

Antenna masts must be bonded to the same grounding electrode used for the building's electrical system to ensure that all exposed, non–current-carrying metal parts are at the same potential. In many cases, masts are connected incorrectly to conveniently located vent pipes, metal gutters, or downspouts. Such a connection could create potential differences between lead-in conductors and various metal parts located in or on buildings, resulting in possible shock and fire hazards. An underground gas piping system is not permitted to be used as a grounding electrode.

The use of separate radio/television grounding electrodes is not required. However, where they are provided, 810.21(J) requires the radio/television system grounding electrode to be connected, via a bonding jumper, to the grounding electrode of the electrical distribution system of the building or structure.

**(K) Electrode Connection.** Connections to grounding electrodes shall comply with 250.70.

## Part III. Amateur and Citizen Band Transmitting and Receiving Stations — Antenna Systems

**810.51 Other Sections.** In addition to complying with Part III, antenna systems for amateur and citizen band transmitting and receiving stations shall also comply with 810.11 through 810.15.

**810.52 Size of Conductors.** Antenna conductors for transmitting and receiving stations shall be of a size not less than given in Table 810.52.