

(1) Not Exposed to Physical Damage. A 6 AWG or larger copper, copper-clad aluminum, or aluminum grounding electrode conductor not exposed to physical damage shall be permitted to be run along the surface of the building construction without metal covering or protection.

(2) Exposed to Physical Damage. A 6 AWG or larger copper, copper-clad aluminum, or aluminum grounding electrode conductor exposed to physical damage shall be protected in rigid metal conduit (RMC), intermediate metal conduit (IMC), Schedule 80 rigid polyvinyl chloride conduit (PVC), reinforced thermosetting resin conduit Type XW (RTRC-XW), electrical metallic tubing (EMT), or cable armor.

(3) Smaller Than 6 AWG. Grounding electrode conductors smaller than 6 AWG shall be protected in RMC, IMC, Schedule 80 PVC, RTRC-XW, EMT, or cable armor.

(4) In Contact with the Earth. Grounding electrode conductors and grounding electrode bonding jumpers in contact with the earth shall not be required to comply with 300.5 or 305.15, but shall be buried or otherwise protected if subject to physical damage.

(C) Continuous. Except as provided in 250.30(A)(5) and (A)(6), 250.30(B)(1), and 250.68(C), grounding electrode conductor(s) shall be installed in one continuous length without a splice or joint. If necessary, splices or connections shall be made as permitted in the following:

- (1) Splicing of the wire-type grounding electrode conductor shall be permitted only by irreversible compression-type connectors listed as grounding and bonding equipment or by the exothermic welding process.
- (2) Sections of busbars shall be permitted to be connected together to form a grounding electrode conductor.
- (3) Bolted, riveted, or welded connections of structural metal frames of buildings or structures.
- (4) Threaded, welded, brazed, soldered or bolted-flange connections of metal water piping.

A building remodeling project or the replacement of existing electrical equipment might necessitate splicing of the GEC. Section 250.64(C)(1) contains the permitted means by which the splice can be considered a permanent connection that provides the intended GEC continuity.

(D) Building or Structure with Multiple Disconnecting Means in Separate Enclosures. If a building or structure is supplied by a service or feeder with two or more disconnecting means in separate enclosures, the grounding electrode connections shall be made in accordance with 250.64(D)(1), (D)(2), or (D)(3).

(1) Common Grounding Electrode Conductor and Taps. A common grounding electrode conductor and grounding electrode conductor taps shall be installed. The common grounding electrode conductor shall be sized in accordance with 250.66, based

on the sum of the circular mil area of the largest ungrounded conductor(s) of each set of conductors that supplies the disconnecting means. If the service-entrance conductors connect directly to the overhead service conductors, service drop, underground service conductors, or service lateral, the common grounding electrode conductor shall be sized in accordance with Table 250.66, note 1.

A grounding electrode conductor tap shall extend to the inside of each disconnecting means enclosure. The grounding electrode conductor taps shall be sized in accordance with 250.66 for the largest service-entrance or feeder conductor serving the individual enclosure. The tap conductors shall be connected to the common grounding electrode conductor by one of the following methods in such a manner that the common grounding electrode conductor remains without a splice or joint:

- (1) Exothermic welding.
- (2) Connectors listed as grounding and bonding equipment.
- (3) Connections to an aluminum or copper busbar not less than 6 mm thick × 50 mm wide (¼ in. thick × 2 in. wide) and of a length to accommodate the number of terminations necessary for the installation. The busbar shall be securely fastened and shall be installed in an accessible location. Connections shall be made by a listed connector or by the exothermic welding process. If aluminum busbars are used, the installation shall comply with 250.64(A).

The common GEC from which the taps are made must be sized from Table 250.66 based on the sum of the circular mil area of the largest ungrounded conductor(s) of each set of conductors that supply the disconnecting means or the sum of the equivalent cross-sectional area for parallel conductors.

As illustrated in Exhibit 250.26, the tap method permitted by this section eliminates the difficulties found in looping GECs from one enclosure to another. The 2 AWG GEC (based on the 350 kcmil ungrounded conductor) shown in Exhibit 250.26 is required to be installed without a splice or joint, except as permitted in 250.64(C), and the 8 AWG and 4 AWG taps are sized from Table 250.66 based on the size of the ungrounded conductor serving the respective service disconnecting means.

As is the case with connectors used for splicing the GEC [see 250.64(C)(1)], the tap connection must have a high degree of reliability under any abnormal conditions of system operation to which it may be exposed. Therefore, if pressure connectors are used for making the tap to the GEC, this requirement specifies not only that the connector be listed but also that it be listed specifically as grounding and bonding equipment, meaning that it has been submitted for certification in accordance with UL 467, *Grounding and Bonding Equipment*. This high a bar is not required for all grounding and bonding connections covered by the requirements of Article 250.

(2) Individual Grounding Electrode Conductors. A grounding electrode conductor shall be connected between the grounding electrode system and one or more of the following, as applicable: