



INFORMATIONAL NOTE FIGURE 250.1 Grounding and Bonding.

250.4 General Requirements for Grounding and Bonding. The following general requirements identify what grounding and bonding of electrical systems are required to accomplish. The prescriptive methods contained in this article shall be followed to comply with the performance requirements of this section.

The requirements of 250.4(A) and (B) specify the overall performance objectives for grounding and bonding of electrical systems and equipment but do not provide specific details or prescriptive rules for things like where to connect or how to size grounding and bonding conductors. The stated performance goals of 250.4 provide the user with a clear direction of what the intended outcomes are when the prescriptive rules contained in the remainder of Article 250 are applied.

(A) Grounded Systems.

(1) Electrical System Grounding. Electrical systems that are grounded shall be connected to earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation.

Informational Note No. 1: An important consideration for limiting the imposed voltage is the routing of bonding and grounding electrode conductors so that they are not any longer than necessary to complete the connection without disturbing the permanent parts of the installation and so that unnecessary bends and loops are avoided.

Informational Note No. 2: See NFPA 780-2020, *Standard for the Installation of Lightning Protection Systems*, for information on installation of grounding and bonding for lightning protection systems.

(2) Grounding of Electrical Equipment. Normally 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.

(3) Bonding of Electrical Equipment. Normally 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.

(4) Bonding of Electrically Conductive Materials and Other Equipment. Normally non-current-carrying electrically conductive materials that are likely to become energized shall be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path.

Δ (5) Effective Ground-Fault Current Path. Electrical equipment and wiring and other electrically conductive material likely to become energized shall be installed in a manner that creates a low-impedance circuit facilitating the operation of the overcurrent device or ground detector for impedance grounded systems. It shall be capable of safely carrying the maximum ground-fault current likely to be imposed on it from any point on the wiring system where a ground fault occurs to the electrical supply source. The earth shall not be considered as an effective ground-fault current path.

The performance objective for the effective ground-fault current path is not always to facilitate operation of an overcurrent protective device (OCPD). For high-impedance grounded systems, for example, the performance objective is to ensure operation of the required ground detector in order to activate some type of an alarm or other signal indicating the existence of a ground-fault condition.

(B) Ungrounded Systems.

(1) Grounding Electrical Equipment. Non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected to earth in a manner that will limit the voltage imposed by lightning or unintentional contact with higher-voltage lines and limit the voltage to ground on these materials.

Informational Note: See NFPA 780-2020, *Standard for the Installation of Lightning Protection Systems*, for information