

NOTICE

UFER GROUNDING

Per 2014 National Electrical Code NFPA 70 Section 250.50

All grounding electrodes as described below that are present at each structure served shall be bonded together to form the grounding electrode system. Where none of these grounding electrodes exist, one or more of the grounding electrodes specified in (4) through (8) shall be installed and used.

(1) Metal Underground Water Pipe. A metal underground water pipe in direct contact with the earth for 10 ft or more (including any metal well casing bonded to the pipe) and electrically continuous (or made electrically continuous by bonding around insulating joints or insulating pipe) to the points of connection of the grounding electrode conductor and the bonding conductor(s) or jumper(s), if installed.

(2) Metal Frame of the Building or Structure. The metal frame of the building or structure that is connected to the earth by one or more of the following methods:

(a) At least one structural metal member that is in direct contact with the earth for 10 ft or more, with or without concrete encasement.

(b) Hold-down bolts securing the structural steel column that are connected to a concrete-encased electrode and is located in the support footing or foundation. The hold-down bolts shall be connected to the concrete-encased electrode by welding, exothermic welding, the usual steel tie wires, or other approved means.

(3) Concrete-Encased Electrode. A concrete-encased electrode shall consist of at least 20 ft of either:

(a) One or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 1/2 in. in diameter, installed in one continuous 20 ft length, or if in multiple pieces connected together by the usual steel tie wires, exothermic welding, welding, or other effective means; or

(b) Bare copper conductor not smaller than 4 AWG.

Metallic components shall be encased by at least 2 in. of concrete and shall be located horizontally within that portion of a concrete foundation or footing that is in direct contact with the earth or within vertical foundations or structural components or members that are in direct contact with the earth. If multiple concrete-encased electrodes are present at a building or structure, it shall be permissible to bond only one into the grounding electrode system.

Informational Note: Concrete installed with insulation, vapor barriers, films or similar items separating the concrete from the earth is not considered to be in "direct contact" with the earth.

Exception: Concrete-encased electrodes of existing buildings or structures shall not be required to be part of the grounding electrode system where the steel reinforcing bars or rods are not accessible for use without disturbing the concrete.

(4) Ground Ring. A ground ring encircling the building or structure, in direct contact with the earth, consisting of at least 20 ft of bare copper conductor not smaller than 2 AWG.

(5) Rod and Pipe Electrodes. Rod and pipe electrodes shall not be less than 8 ft in length and shall consist of the following materials:

(a) Grounding electrodes of pipe or conduit shall not be smaller than 3/4 in. and, where of steel, shall have the outer surface galvanized or otherwise metal-coated for corrosion protection.

(b) Rod-type grounding electrodes of stainless steel and copper or zinc coated steel shall be at least 5/8 in. in diameter, unless listed.

(6) Other Listed Electrodes. Other listed grounding electrodes shall be permitted.

(7) Plate Electrodes. Each plate electrode shall expose not less than 2 ft of surface to exterior soil. Electrodes of bare or conductively coated iron or steel plates shall be at least 1/4 in. in thickness. Solid, uncoated electrodes of nonferrous metal shall be at least 0.06 in. in thickness.

(8) Other Local Metal Underground Systems or Structures. Other local metal underground systems or structures such as piping systems, underground tanks, and underground metal well casings that are not bonded to a metal water pipe.

Metal underground gas piping systems and/or Aluminum shall not be used as grounding electrodes.