

SECTION 16170 – “GROUNDING AND BONDING”

- 1.0 All materials that are part of the grounding system shall be copper.
- 2.0 The professional shall document the work associated with the grounding system – reference to NEC only is unacceptable. The grounding system shall include the following grounding electrodes: building metal water pipe, building structural steel, Ufer ground (connection to reinforcing steel not smaller than #4 in the column footings and grade beams) at approximately every 100 feet around building, and a ground loop around the entire building (#4/0 AWG minimum size). Ground rods tied to the loop shall be provided at the service entrance ground bus (triad), at each lightning downcomer (when provided), and at each corner of the building. Known areas of high soil resistivity will be provided with additional ground rods or chemically enhanced ground rods.
- 3.0 A separate ground conductor shall be installed with all branch circuits. Reliance on the conduit as the grounding means is unacceptable.
- 4.0 Isolated ground conductors, if required, shall be connected to the building ground system at its separately derived supply transformer grounding location. The design shall be in accordance with IEEE Std.1100 guidelines.
- 5.0 All underground connectors shall be of the exothermic welded type.
- 6.0 The professional shall specify grounding systems that meet the following ground resistance values.
 - A. Data Center: Less than 2 ohms.
 - B. Outdoor Transformer/Switchyard: Less than 5 ohms.
 - C. Low-Voltage Building Service: Less than 10 ohms.
 - D. Medium-Voltage Service: Less than 5 ohms.
- 7.0 Testing of the system shall be documented as part of the design to verify conformance. Include the following:
 - A. Perform a megger test using the “Fall-of-Potential Method” to determine that the proper ground resistance has been achieved, and submit a written report of the megger test of ground resistance
 - B. Perform ground fault protection system performance testing for each 480-volt

switchboard having ground fault protection and for any generator system.

C. Perform Ground Continuity Tests:

1. From main switchgear to grounding electrode and/or cold water main.
2. Between each main secondary feeder switchboard ground and its termination point (distribution panels, panelboards, motor control centers, UPS systems, electric heater disconnects, chiller starters, and other such equipment) and all feeders shown on single-line diagram.
3. Between each distribution panel to panelboards and between each panelboard to panelboard (excluding branch circuits).
4. Test each receptacle for proper polarity and ground using a plug-in test device.

8.0 Provide test wells for underground grounding loop in at least two (2) locations.

END OF SECTION