

26 05 26 – Grounding and Bonding for Electrical Systems

1. Introduction

- A. Grounding is utilized within electrical distribution systems to provide an alternative, low-impedance path around the electrical system for short circuit current to flow during a line to ground fault. In order for the protective devices to function properly and to ensure the safety of the general public and all maintenance personnel, it is critical that the entire electrical distribution system be properly grounded.

2. References

- A. NFPA 70 National Electrical Code
- B. Underwriters Laboratories Inc (UL) 467 – Grounding and Bonding Equipment

3. Design Standards

- A. All grounding and bonding materials shall be copper unless otherwise noted.
- B. Equipment grounding conductors shall be insulated with green colored insulation.
- C. Grounding electrode conductors shall be stranded cable.
- D. Grounding electrodes (i.e. ground rods) shall be 3/4 inch x 10 foot copper-clad steel.
- E. Grounding bus bars mounted exterior to electrical distribution equipment shall be provided with insulated standoffs.
- F. All service entrances shall be solidly grounded using a grounding electrode system connection between ground rods, building steel and metallic cold-water piping.
- G. Additional grounding resistance schemes may be considered but must be approved by the Owner to reduce ground fault current, voltage transients or damage to equipment.
- H. Additional forms of electric generation shall be considered separately derived services.
- I. Provide grounding lugs in all pull boxes and enclosures.
- J. Provide bonding bushings on all metallic raceways inside equipment enclosures that are not equipped with grounding lugs or a mechanical connection. Connect each bonding bushing to the grounding bus inside the equipment with bare conductors.
- K. Isolated grounds shall be derived at the service entrance.
- L. Provide (2" or 4") x 12" x 1/4" thick grounding bard in each telecommunications room

4. Documentation and Review Requirements

- A. Provide detail that indicates the grounding connections for all transformers.
- B. Provide detail that indicates the grounding connections for all separately derived services.
- C. Provide riser diagram and details that indicate the telecommunications grounding system.

5. Installation and Performance Requirements

- A. All connections to grounding bus bars either be exothermically welded or utilize a minimum of two (2) mechanical bolts
- B. Ground all metal raceways, wiring devices, lighting fixtures, motor frames, switchgear, panels, cable supports, transformer neutrals and non-current carrying metallic parts.
- C. Provide insulated equipment grounding conductor for all feeders and branch circuits. Raceways shall not be relied on for equipment grounding continuity.
- D. Ground each wiring device by means of a separate conductor that connects the ground terminal of the wiring device to the equipment-grounding conductor.
- E. Bare copper conductors installed in metallic raceway shall be bonded at both ends of the metallic raceway.
- F. All underground connections and connections to building steel shall be exothermically welded.
- G. Provide ground-bonding jumpers across all sections of cable tray and fittings in accordance with manufacturer's instructions.
- H. Ground shielded instrumentation cables in accordance with manufacturer's instructions.
- I. In addition to the branch circuit equipment grounding conductors, provide a separate grounding electrode and grounding conductor for each metal light pole.
- J. Provide protection for ground conductors that are subject to physical damage.
- K. Prior to equipment shutoff valve, bond gas piping to electrical grounding system.
- L. Drive ground rod such that top of ground rod is below frost line or at the height of the ground loop whichever is lower.
- M. Perform ground resistance test. If resistance to ground exceeds 5 ohms, provide additional ground rods to reduce ground resistance. Owner to be present during testing.
- N. Perform equipment grounding system continuity test.

6. As-Built Requirements

- A. Ground resistance test measurements.