26 05 26 Grounding and Bonding for Electrical Systems

1. General:
   A. Provide grounding and bonding in accordance with the requirements of the National Electrical Code and the local AHJ.
   
   B. The "Electrical Service" for any facility is as it is defined by Article 230 in the NEC. Service drops or laterals to these service entrance conductors will be provided from distribution transformers served from the University's distribution system or the local electrical utility. Grounding and bonding conductors shall be sized in accordance with Article 250 of the NEC.

2. Materials and Methods:
   A. Grounding mats and risers for buildings shall be minimum No. 4/0 AWG bare, stranded copper.
   
   B. For low voltage system grounding systems, all connections of grounding conductors No. 8 AWG and larger and all connections to be placed underground or in concrete shall be made by Burndy Hyground connectors or by exothermic welding.
   
   C. Exposed grounding conductors to be connected to equipment shall be made using copper compression grounding fittings or lugs bolted to the equipment.
   
   D. Grounding of equipment rated greater than 600 volts or 600 amps shall be provided by two independent grounding conductors.
   
   E. Grounding conductors shall be provided for all feeders and branch circuits. Conduits shall not be the only grounding path.
   
   F. Provide protection for grounding conductors subject to physical damage. If a metallic conduit is to be used for protection, the conductors shall be bonded to the conduit at both ends.
   
   G. The lightning protection system shall be bonded to the ground electrode system after the lightning protection system is completed and tested.
   
   H. A copper ground reference bus with pre-drilled termination holes and mounted on insulating stand-offs shall be installed in the electrical room adjacent to the service entrance equipment and shall be bonded directly to the service entrance ground bus.

3. Medium Voltage Systems:
   A. A 4/0 THWN grounding conductor shall be run with all medium voltage circuits.
B. For medium voltage system grounding, all connections of grounding conductors to be placed underground or in concrete shall be made by exothermic welding.

C. Manholes shall be grounded with two 5/8” inch by 10 foot grounding rods located in opposite corners of the manhole. Provide a No. 4/0 AWG copper grounding loop around the manhole bonded to all the grounding rods. Pigtails shall be provided from this loop to all metallic devices located in the manhole including but not limited to cover frame, ladder, cable racks, concrete inserts, cable grounding conductors and cable shields that are spliced in the manhole.

D. Pad mounted switches shall be grounded with two 5/8” inch 10 foot grounding rods located on opposite corners of the switch and provided with a loop of No. 4/0 AWG bare copper wire.

E. The shields of medium voltage cables shall be grounded at both ends and at every location at which it is spliced.

F. The grounded conductor in each duct bank shall be bonded to ground at all equipment, manholes and enclosures through which it passes.

4. Instrumentation and Controls:

A. Provide grounding to instrumentation, controls and electronic devices in accordance with the NEC or the manufacturer's recommendations, whichever is stricter.

B. Shielded instrumentation cables shall have their drain wires grounded at one end only. The shield and drain wires at the other end shall be cut back and taped to be isolated from ground.

5. Testing:

A. Ground electrode systems shall be tested utilizing the Fall-of-Potential method as specified in ANSI/IEEE Standard 81 “Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of an Earth System”.

B. Test results shall be in writing and shall indicate temperature and humidity at the time of testing. The ground resistance shall not exceed 15 ohms at 60 Hz. If any special equipment being installed requires a lower ground system resistance, that equipment manufacturer's maximum ground resistance shall apply.