Basis of Design
This section applies to the design and installation of electrical grounding.

Design Criteria
- Use the UFER grounding philosophy when designing grounding systems.
- Provide all grounding for electrical systems and equipment, including but not limited to:
  1) Service neutral
  2) Raceway systems
  3) Switchboards and panelboards
  4) “Separately derived system” (transformer or emergency power supply)
  5) Electrically operated equipment and devices
- Provide additional grounding requirements for hospital distribution systems when required.
- Provide additional grounding requirements for computer systems and other electrical noise-sensitive equipment when required.
- Provide lightning protection system requirements when required.
- Refer to section 16B for additional criteria when designing grounding for the primary distribution system.

Design Evaluation
The following information is required to evaluate the design:
- **Schematic Design Phase**: Description of overall design concept and which grounding systems will be included.
- **Design Development Phase**: Preliminary riser diagram for grounding systems. Draft specifications.
- **Construction Document Phase**: Complete riser diagram for grounding systems. Details of ground busses, lightning terminals, and other grounding equipment when required. Complete specifications.

Submittals
- Provide catalog information for terminations, ground busses, and lightning terminals/plates.
Products, Materials and Equipment

- Grounding conductors shall be copper only. Use bare or green insulated in sizes #10 AWG or larger. Use green insulated for size #12 AWG.
- Ground rods shall be ¾" x 10' 0" copper clad steel.
- Ground connections and ground cable splices that are accessible for maintenance and repair shall be thermal welding or copper compression set type connectors UL listed for grounding purposes. Ground lugs, where provided as standard manufacturer’s items on equipment furnished, may be used.
- All ground connections underground or inaccessible for maintenance and repair shall be thermal welding only. Compression connectors are not allowed.

Installation, Fabrication and Construction

- All branch circuits shall include a ground wire connected between the branch circuit panelboard ground bus and the wiring device or equipment ground terminal that the branch circuit serves. One ground wire in each branch circuit raceway, looped between ground terminals, is required.
- Where ground wire is exposed to physical damage, protect with rigid non-ferrous conduit as permitted by applicable code.
- In conduit runs requiring an expansion fitting, install a bonding jumper around the fitting to maintain continuous ground continuity.
- Protect ground cables crossing expansion joints or similar separations in structures or paved areas from damage by means of suitable approved devices or methods of installation which will provide the necessary slack in the cable across the joint to permit movement.
- Provide a grounding bushing with #10 ground conductor (or larger when required by code) to the grounding bus in the panelboard and switchboards.

END OF DESIGN GUIDE SECTION