

SECTION 16070

GROUNDING

PART 1 - GENERAL

1.1 GENERAL

- A. The provisions of Section 16010, General Requirements for Electrical Work apply to the Work of this Section.
- B. The Contractor shall provide a complete grounding system including grounding electrodes, electrode conductors, bonding jumpers, equipment grounding conductors, connections and other materials as may be required.

1.2 CODES AND STANDARDS:

- A. Products shall comply with the following codes and standards and shall be UL listed and labeled.
 - NFPA 70 National Electrical Code
 - UL 467 Grounding and Bonding Equipment

PART 2 - PRODUCTS

2.1 GROUND RODS

- A. Ground rods shall be 3/4 inch copper clad steel furnished in 10 foot lengths.

2.2 CONDUCTORS

- A. Bare grounding conductors shall be soft drawn stranded copper, sized in accordance with NEC Article 250 unless otherwise noted on the Drawings.
- B. Insulated grounding conductors shall be stranded copper with Type TW, THW or THHN/THWN insulation colored green.

2.3 CONNECTIONS

- A. Welded connections shall be exothermic reaction type, Cadweld or approved equal. The Contractor shall provide all molds, crucibles, weld metal and necessary materials to complete all connections.
- B. Lugs shall be long barrel, two hole compression type for No. 3/0 AWG wire and larger and short barrel, one hole compression type for grounding conductors No. 2/0 AWG and smaller.

PART 3 - EXECUTION

3.1 GROUNDING ELECTRODE SYSTEM

- A. Grounding electrodes as shown on the Drawings and as required by code shall be provided. All electrodes shall be bonded together to form the grounding electrode system.

- B. Ground rods shall be driven vertically with the upper end of the rod not less than 2-1/2 feet below finished grade. When rock is encountered, the rod may be driven at an angle not to exceed 45 degrees from the vertical.
- C. Ground ring conductors shall be bare No. 3/0 AWG copper installed minimum 2-1/2 feet below finished grade.
- D. Conductors encased in concrete footings, floor slabs or duct banks shall be bare copper, No. 3/0 AWG unless otherwise noted.
- E. Building structural steel or metal framing shall be connected at all points indicated on the Drawings.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. A separate insulated green copper conductor shall be installed as an equipment grounding conductor in all raceway and with every feeder, branch circuit and control circuit. This shall be in addition to the grounded metallic conduit system.
- B. All equipment grounding conductors shall be terminated at both ends.

3.3 GROUNDING ELECTRODE CONDUCTOR

- A. The electrical service and all separately derived systems shall be grounded in accordance with NEC Article 250.
- B. The grounding electrode conductor shall be copper, sized in accordance with NEC Article 250 or as shown on the Drawings.

3.4 CONNECTIONS

- A. All conductors below grade or encased in concrete and all connections to building steel shall be exothermic weld.
- B. Connections to equipment ground busses or pads shall be compression type lugs, bolted to the bus or pad.
- C. Grounding connections shall be made to clean, dry surfaces. All scale, rust, paint, grease and other contamination shall be removed prior to making connections. Upon completion of welded connections all slag shall be removed.

3.5 RACEWAY, CABLE TRAY AND EQUIPMENT

- A. All raceway, cable tray and noncurrent carrying metal equipment and enclosures shall be electrically continuous and bonded to the grounding system.
- B. Where equipment is provided with a ground bus all equipment grounding conductors shall be terminated on the bus. The Contractor shall perform all drilling and tapping required and provide all hardware.

- C. Switchboard ground buses shall be connected to the grounding electrode system at both ends with No. 3/0 AWG copper conductors.
- D. All cable tray shall be provided with a continuous No. 6 AWG bare copper ground conductor installed on the exterior rail and supported at six (6) foot intervals and on every fitting with Thomas & Betts Cat. No. 10109 ground clamps.
- E. All conduit terminating on the cable tray system shall be provided with grounding bushings and bonded to the cable tray grounding conductor.

3.6 **BONDING TO OTHER SYSTEMS**

- A. An accessible means for connecting intersystem bonding and grounding conductors shall be provided.
- B. Interior metal water piping and sprinkler piping shall be bonded in accordance with NEC ART 250-80.

END OF SECTION 16070