



**.1 General**

- .1 This section covers work required for grounding of primary switchgear and for connection to the campus grounding system.

**.2 Materials**

- .1 Use only ground rod electrodes, copper clad steel 19 mm dia by 3 m long. A minimum of four ground rods shall be provided and connected to the main grounding buss in the main electrical room.
- .2 Conductors for installation of campus ground in duct system and manholes shall be PVC-insulated, coloured green, stranded, untinned, soft annealed copper wire size # 4/0 AWG, unless noted otherwise.
- .3 Conductors: bare, stranded, untinned, soft annealed copper wire, size # 3/0 AWG, for ground bus, electrode interconnections, metal structures, transformers, switchgear, ground connections.
- .4 Bonding Conductor: # 2/0 AWG stranded soft annealed copper.
- .5 Conductors for grounding cable sheaths, raceways, pipe work, screen guards, switchboards, potential transformers: PVC-insulated, coloured green, stranded, untinned, soft annealed copper wire, size # 4 AWG.
- .6 Conductors: No. 3/0 AWG extra flexible (425 strands) copper conductor for connection of switch mechanism operating rod to gradient control mat, fence gates, vault doors.
- .7 Cable sheath isolating sleeves: Elastimold or equal, to match 15 kV cable connector kits on campus.
- .8 Wall-mounted ground bus shall be copper ground bus mounted on insulated supports on wall of electrical room. Bus to be 75 mm wide and 6 mm thick. Length of bus to suit connection requirements.

**.3 Grounding Installation**

- .1 Install continuous grounding system including electrodes, conductors, connectors, accessories, as indicated and to requirements of local authority having jurisdiction.
- .2 Install connectors to manufacturers instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to electrodes, structural steel work, using copper welding by thermit process or approved crimp-on type compressive connectors.

**.4 Neutral Grounding**

- .1 Connect transformer neutral and distribution neutral together using 1000 V insulated conductor to one side of ground test link, the other side of the test link being connected directly to main station ground. Ensure distribution neutral and neutrals of potential transformers and service banks are bonded directly to transformer neutral and not to main station ground.
- .2 Interconnect electrodes and neutrals at each grounding installation.
- .3 Connect neutral of station service transformer to main neutral bus with tap of same size as secondary neutral.
- .4 Ground transformer tank with continuous conductor from tank ground lug through connector on ground bus to primary neutral. Connect neutral bushing at transformer to primary neutral in same manner.



**.5 Grounding In Manholes**

- .1 Install conveniently located grounding stud, electrode, size 2/0 AWG stranded copper conductor in each manhole.
- .2 Install ground rod with lug for grounding connection in each manhole so that top projects through bottom of manhole.

**.6 Cable Sheath Grounding**

- .1 Bond single conductor, metallic sheathed cables together at one end only. Break sheath continuity by inserting insulating sleeves in cables.
- .2 Use No. 6 AWG flexible copper wire soldered, not clamped, to cable sheath.
- .3 Connect bonded cables to ground with No. 2/0 AWG copper conductor.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Use # 4/0 AWG bare copper cable for main ground bus of substation.
- .6 Use tinned copper conductors for aluminum structures.

**.7 Campus Ground**

- .1 Extend from existing manhole infrastructure a # 4/0 insulated ground to substation wall-mounted ground bus in main electrical room. Run through 50 mm duct.