

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 American National Standards Institute /Institute of Electrical and Electronics Engineers ( ANSI/IEEE )
  - .2 Canada Green Building Council (CaGBC)
    - .1 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations.
  - .3 Lightning and Grounding Protection for MCTS sites: 67-013-000-ES-EQ-001, see Appendix B.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Sustainable Design Submittals:
    - .1 LEED Canada submittals: in accordance with Section 01 35 21 - LEED Requirements.
    - .2 Construction Waste Management:
      - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
      - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
- 1.3 CLOSEOUT SUBMITTALS
- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- 1.4 DELIVERY, STORAGE AND HANDLING
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
  - .2 Develop Construction Waste Management Plan related to Work of this Section and in
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- 1.4 DELIVERY,  
STORAGE AND  
HANDLING  
(Cont'd)
- .2 (Cont'd)  
accordance with Section 01 35 21 - LEED  
Requirements.
  - .3 Packaging Waste Management: remove for reuse  
or return of pallets, crates, padding,  
banding, and packaging materials as specified  
in Construction Waste Management Plan in  
accordance with Section 01 74 21 -  
Construction/Demolition Waste Management and  
Disposal and Section 01 35 21 - LEED  
Requirements.

PART 2 - PRODUCTS

- 2.1 EQUIPMENT
- .1 Rod electrodes: copper clad steel 19 mm  
diameter by minimum 3 m long.
  - .2 Grounding conductors: bare stranded copper,  
soft annealed, size as indicated.
  - .3 Insulated grounding conductors: green, copper  
conductors, Type TW, size as indicated.
  - .4 Ground bus: copper, size as indicated,  
complete with insulated supports, fastenings,  
connectors.
  - .5 Non-corroding accessories necessary for  
grounding system, type, size, material as  
indicated, including but not necessarily  
limited to:
    - .1 Grounding and bonding bushings.
    - .2 Protective type clamps.
    - .3 Bolted type conductor connectors.
    - .4 Thermit welded type conductor  
connectors.
    - .5 Bonding jumpers, straps.
    - .6 Pressure wire connectors.
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PART 3 - EXECUTION

- 3.1 EXAMINATION .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- 3.2 INSTALLATION GENERAL .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- .2 Lightning protection; to CAN/CSA-B72-M87 "Installation Code for Lightning Protection Systems":
    - .1 Refer to drawings for details.
  - .3 Provide grounding ring around the exterior of building where indicated on the drawings. Complete installation in accordance with the Fisheries and Oceans Standard 67-013-000-ES-EQ-001 "LIGHTNING AND GROUNDING PROTECTION FOR MCTS SITES".
  - .4 Provide grounding and lightning protection for roof mounted equipment as indicated.
  - .5 Install connectors in accordance with manufacturer's instructions. All wiring connections to be donw with copper pressure connectors.
  - .6 Protect exposed grounding conductors from mechanical injury.
  - .7 Make buried connections, and connections to electrodes, using copper welding by thermit process.
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- 3.2 INSTALLATION .8 Use mechanical connectors for grounding  
GENERAL connections to equipment provided with lugs.  
(Cont'd)
- .9 Soldered joints not permitted.
- .10 Install bonding wire for flexible conduit,  
connected at both ends to grounding bushing,  
solderless lug, clamp or cup washer and screw.  
Neatly cleat bonding wire to exterior of  
flexible conduit.
- .11 Install separate ground conductor to outdoor  
lighting standards.
- .12 Connect building structural steel and metal  
siding to ground by welding copper to steel.
- .13 Ground secondary service pedestals.
- .14 All equipment and exposed non-current  
carrying metal, conduits and parts to be  
permanently and effectively grounded to meet  
minimum requirements of the CEC Section 10 and  
as indicated on drawings and further  
specified. Standards set either by drawings or  
specifications which are above those covered  
by the CEC Section 10 are not to be reduced  
under any circumstances.
- 3.3 ELECTRODES .1 Install rod electrodes and make grounding  
connections as indicated.
- .2 Bond separate, multiple electrodes together.
- .3 Use size 4/0 AWG copper conductors for  
connections to electrodes as indicated.
- .4 Make special provision for installing  
electrodes that will give acceptable  
resistance to ground value where rock or sand  
terrain prevails.
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3.4 SYSTEM AND  
CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections to neutral of primary 600 V system, secondary 208 V system.

3.5 EQUIPMENT  
GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, starters, control panels, building steel work, generators, distribution panels, outdoor lighting, cable trays.
- .2 The Master Ground Bar (MGB), rigid copper located near the AC Power service entrance equipment as indicated.
- .3 Secondary Ground Bars, rigid copper as indicated.

3.6 GROUNDING BUS

- .1 Install copper grounding bus mounted on insulated supports on wall of communication equipment room, LAN Room, roof structure, and as indicated.
- .2 Ground items of electrical equipment in electrical room and IT equipment in communication equipment room to ground bus with individual bare stranded copper connections size as indicated.

3.7 COMMUNICATION  
SYSTEMS

- .1 Install grounding connections for telephone, fire alarm, intercommunication systems as follows:
  - .1 Telephones: make telephone grounding system in accordance with telephone company's requirements.
  - .2 Sound, fire alarm, intercommunication systems as indicated and as required by the equipment manufacturers.

- 3.8 FIELD QUALITY CONTROL
- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
  - .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
  - .3 Perform tests before energizing electrical system.
  - .4 Disconnect ground fault indicator during tests.
  - .5 Grounding to be tested and verified by a qualified service provider, and issue an official certificate along with test results.
- 3.9 CLEANING
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
  - .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.
    - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.