SECTION 620
SIGNAL INSTALLATION GROUNDING

620-1 Description.

Install grounding for traffic signal installations to provide personnel and equipment protection against faults, surge currents and lightning transients.

620-2 Materials.

Use materials meeting the requirements of Section A620 of the current Minimum Specifications for Traffic Control Signal Devices (MSTCSD), except as provided in 603-2.2.

620-3 Requirements for Grounding.

620-3.1 General: Meet all local electrical codes which exceed these Specifications. Install all grounding conductors 18 inches [450 mm] below finished grade. Accomplish grounding for any element of a traffic signal installation by installing either a grounding electrode assembly or a grounding electrode array, unless otherwise specified in the Contract Documents.

Use solid No. 6 AWG copper insulated (green) conductor for electrical or lightning protection ground from the system ground bus or barrier plate(s) to the grounding electrodes and from grounding electrode to grounding electrode. Use either solid or stranded No. 6 AWG copper insulated (green) conductor for all other applications.

Bond all grounding electrode assemblies and arrays together and place in a location that minimizes the length of the grounding conductor between the assembly or array and the element being grounded.

Attain a resistance to ground measurement of 25 Ω or less, in accordance with 620-3.4 for each of the following elements by either installing a grounding electrode assembly or array, unless otherwise approved by the Engineer:

(a) Electric power service
(b) Pole with electrical power service installed
(c) Pole mounted cabinet with electrical power service installed

Install an array when conditions require the driving of more that 20 feet [6 m] of grounding electrode to attain the required resistance to ground measurement of 25 Ω or less.

Install 20 feet [6 m] of ground assembly or array for each of the following elements:

(a) Controller or detector cabinet
(b) Pole
(c) Pedestals for pedestrian signals
(d) Metal cover used with pull boxes

Ensure that all separately grounded elements at an intersection are bonded together to form an intersection grounding network.

For span wire assemblies, use the span wire to connect the grounding electrode assemblies or arrays of the poles.

Do not install a grounding electrode assembly or array for a base mounted cabinet within 6 feet [1.8 m] of a grounding electrode assembly or array installed for a pole.

Make all bonds between ground wires and grounding electrode assemblies or arrays with an exothermic bond with the following exception: do not exothermically bond grounding electrode to grounding electrode connections or the system ground bussbar or barrier plate connections located within a cabinet. Use exothermic materials from the same source to make all the exothermic bonds at an intersection, meeting the requirements of the IEEE standards 80 and 837.

620-3.2 Grounding Electrode Assembly: Provide a grounding electrode assembly consisting of one or more grounding electrodes coupled together, such that the total length of the electrodes in the

assembly is a minimum of 20 feet [6 m], driven into the earth at a single point, without disrupting the electrical continuity of the assembly.

Use a coupling device for grounding electrode to grounding electrode connections approved by the Engineer.

Obtain Department of Transportation Traffic Signal Resistance Measurement Data Sheets from the District Traffic Operations Office. Measure the grounding electrode resistance to ground in accordance with 620-3.4 at 10 feet [3 m] intervals, during the driving of grounding electrodes and record the readings on the Data Sheets. After completing the Data Sheets, submit them to the Engineer. Leave a copy of the Data Sheets in the controller cabinet.

Install the grounding electrode assembly so that the final elevation at the top is 6 inches [150 mm] below finished earth grade. Mark the location of the assembly with a stake and keep uncovered until the Engineer performs a final inspection of the installation.

620-3.3 Grounding Electrode Array: Provide a grounding electrode array consisting of two or more grounding electrode assemblies, bonded together, separated by a distance equal to the length of the longer grounding electrode assembly.

620-3.4 Ground Resistance: Measure all resistance, in the presence of the Engineer with a null balanced earth ground megger utilizing the three point measure technique. Obtain the Engineer's approval prior to using a ground impedance impulse tester.

620-3.5 Grounding Poles: Ground all metal poles, including pedestals for pedestrian signals, in accordance with the details for grounding and connections shown in the Design Standards, Index No. 17727.

For non-metallic poles, including pedestals for pedestrian signals, accommodate the ground connection from signal heads and span wires to the ground electrode assembly or array located at the pole base in accordance with the details in the Design Standards, Index No. 17727.

When erecting new metal poles within 10 feet [3 m] of existing metal poles or structures, bond the new and existing poles or structures together.

620-3.6 Grounding Electric Power Service: Ground all electric power services in accordance with the details for grounding and connections shown in the Design Standards, Index No. 17736.

620-3.7 Grounding Controller or Detector Cabinets: Ground controller or detector cabinets to the bussbar located in the cabinet. Place the grounding electrode assembly or array as close to the cabinet as possible.

620-3.8 Grounding Span Wire Mounted Signal Heads and Electrically Powered Signs: Ground span wire mounted signal heads and electrically powered signs through the span wire assembly in accordance with the details shown in the Design Standards, Index No. 17727.

Do not use guy wires for grounding purposes, however bond any guy wire to the span wire as part of the intersection grounding network.

620-4 Method of Measurement.

620-4.1 General: Measurement for payment will be in accordance with the following work tasks.

620-4.2 Furnish and Install: The Contract unit price per foot [meter] of Grounding Electrode, furnished and installed, will include the grounding electrode, coupling devices, grounding conductors, and connecting devices as specified in the Contract Documents, and all labor, equipment, and miscellaneous materials necessary for a complete and accepted installation.

620-4.3 Furnish: The Contract unit price per foot [meter] of Grounding Electrode, furnished, will include the cost of the grounding electrode, coupling devices, grounding conductors, and connecting devices as specified in the Contract Documents, plus all shipping and handling costs involved in delivery as specified in the Contract Documents.

620-4.4 Install: The Contract unit price per foot [meter] of Grounding Electrode, installed, will include the cost of all labor, equipment, and miscellaneous materials used to install grounding electrode assemblies or arrays at all locations required by the Contract Documents.

The Engineer will supply the grounding electrode(s), coupling devices, grounding conductors, and connecting devices.

620-5 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No.	620- 1-	Grounding Electrode - per foot.
Item No.	2620- 1-	Grounding Electrode - per meter.