SECTION 264101

UNDERGROUND COUNTERPOISE

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

**An underground counterpoise is required for all Mail Processing Facilities and Customer Service Facilities over 60,000 square feet with more than 200 employees and Carrier Annexes over 10,000 square feet. Provide the counterpoise regardless of a lightning protection system. Verify counterpoise requirements with USPS Project Manager. Refer to Handbook AS-503, Standard Design Criteria for more information.**

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1. GENERAL
   1. SUMMARY
      1. The work covered by this section of the specifications consists of furnishing all labor, materials and items of service required for the completion of an underground counterpoise grounding system as approved by the Engineer and in strict accordance with this section of the specifications.
         1. If any departure from these specifications or submittal drawings covered below are deemed necessary by the contractor, details of such departures and reasons therefore shall be submitted as soon as practicable to the Engineer for approval. No such departures shall be made without the prior written approval of the Engineer.
      2. Section includes:
         1. Grounding Electrodes.
         2. Ground Loop Conductors.
         3. Grounding and Bonding.
      3. Substitutions:
         1. Section 016000 – Product Requirements: Product options and substitutions. Substitutions permitted.
      4. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
      5. Related Sections:
         1. Section 260500 - Common Work Results for Electrical: Basic electrical methods.
   2. SCOPE OF WORK
      1. Install a counterpoise system around the building to ensure equal ground potential throughout the facility. The counterpoise system must consist of a buried loop of copper wire, not smaller than #4/0 AWG, stranded copper cable which encircles the building and is buried a minimum of 30 inch below final grade (BFG). Ground rods must be driven along this loop at 100 foot intervals to connect building steel and equipment to the ground grid such that each major piece of equipment, including the main switchboard and main water supply or structure, have common ground paths.

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**NOTE TO SPECIFIER**

When adding a counterpoise system to an existing facility the perimeter and interior columns cannot easily be bonded to the ground loop conductor. Include paragraph 1.2.B below for new construction only.

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* + 1. As a minimum, connect every other perimeter column to the counterpoise and provide cross connections every 300 feet. All perimeter and interior steel columns must be bonded to the ground loop conductor if a building lightning protection system is deemed necessary.
    2. All connections and joints must be the exothermic weld type. Connect building steel and conductive enclosures of electrical equipment to the ground system.
    3. The perimeter fencing within 10 feet of the buried counterpoise shall be bonded using #2/AWG/Copper electrode conductors.
  1. REFERENCES
     1. UL 96 - Lightning Protection Components.
     2. UL96A - Installation Requirements for Lightning Protection Systems.
     3. ANSI/NFPA 780 - Lightning Protection Code.
     4. LPI-175 - Lightning Protection Institute.
  2. SUBMITTALS
     1. Submit shop drawings showing layout of ground loop conductors, grounding electrodes, and bonding connections. Include electrode, and conductor sizes, and connection and termination details. Drawings shall include full layout of cabling and points, and connections.
     2. Submit product data showing dimensions and materials of each component.
     3. Submit manufacturer's installation instructions.
     4. Submittal shall include ground test wells.
  3. PROJECT AS-BUILT DOCUMENTS
     1. Submit project as-built documents.
     2. Accurately record actual locations of grounding electrodes, bonding connections, and routing of system conductors.
  4. QUALITY ASSURANCE
     1. Manufacturer: Company specializing in lightning protection equipment with minimum 5 years documented experience and member of the Lightning Protection Institute.
     2. Installer: Authorized installer of manufacturer with minimum 5 years documented experience and member of the Lightning Protection Institute.

1. PRODUCTS

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**NOTE TO SPECIFIER**

Verify manufacturer information, Product numbers, and availability at time of Project Manual preparation for Project.

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* 1. MANUFACTURERS
     1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
        1. Harger Lightning Protection, Inc., Grayslake, IL (800) 842-7437.
        2. Heary Brothers Lightning Protection, Inc., Springville, NY (716) 941-6141.
        3. Independent Lightning Protection, Inc., Goshen, IN (800) 860-8388.
        4. Robbins Lightning, Inc., Maryville, MO (800) 426-3792.
        5. Thompson Lightning Protection, Inc., St. Paul, MN (800) 777-1230.
  2. STANDARDS
     1. All equipment used in this installation shall be UL approved and labeled in accordance with UL procedures.
     2. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards and LPI and UL code requirements.
  3. EQUIPMENT
     1. All materials shall be copper or bronze as indicated on the drawings. All materials shall be UL approved and labeled and of the size, weight, and construction for use on building in accordance with LPI and UL Code requirements and as per manufacturer's recommendations.
     2. Bonding devices, bonding plates and miscellaneous connectors shall be of cast bronze with bolt pressure connections to cable. Cast or stamped crimp fittings are not acceptable.
     3. Ground rods shall be 3/4-inch diameter, 10 feet long sectional copperweld steel (minimum).
     4. All miscellaneous bolts, nuts and screws shall be brass, bronze, or stainless steel. Crimp fittings are not acceptable. Stamped bronze materials are not acceptable.

1. EXECUTION
   1. INSTALLATION
      1. Install in accordance with manufacturer’s instructions.
      2. Install in accordance with UL 96A, ANSI/NFPA 780 and LPI.
      3. Provide proper grounding of all grounding media in, on and around structure to provide common ground potential per NFPA 780 4.14 and 4.15 including electric service, telephone, and antenna system grounds as well as underground metallic piping systems, underground metal conduits, etc.
      4. All exposed conductors located 6 feet or less above finished floor or finished grade are to be suitably protected/shielded from mechanical damage.
      5. Coordinate and receive approval of all connections to structural steel, rebar, etc. with Structural Engineer prior to submittal of shop drawings.
      6. Submittal of shop drawing by Contractor is evidence that the Contractor has received approval of penetrations, connections, etc., by all parties and that Contractor assumes responsibility for such penetrations, connections, etc.
      7. Ground electrodes shall be installed within 12 inch dia. x 12 inch long PVC access wells equipped with cast iron covers; Harger #362PS12CILS80. Install access wells in unpaved, accessible areas, but in no instance less 2 ft. from foundation wall. Access wells shall be set within a 6 inch deep, gravel bed, 3 inches wide all round the PVC sleeve. Driven rods shall penetrate earth at least 10 ft. - 0 in. All down conductors and below grade connections shall be bonded utilizing exothermic welds.
   2. FIELD QUALITY CONTROL
      1. The resistance of the counterpoise grounding system shall not exceed 5 ohms. Where tests show resistance to ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms, or less, by driving additional ground rods, lengthening ground rods, or installing ground enhancement materials; then retest to demonstrate compliance. Furnish written report of all tests. Refer to section 1.3 Pre-Construction Testing.
      2. Obtain the service of an LPI certified installer to provide inspection and certification of the counterpoise grounding system under provisions of UL 96A. Submit certification and submit in O&M Manual.
      3. Submit test results on each ground location including final length of each ground rod and final distance between each installed ground rod at each ground rod location.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022