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SECTION 16670

LIGHTNING PROTECTION SYSTEM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to work specified of this section.

1.02 DESCRIPTION

A. General: Provide a complete lightning protection system as indicated on the drawings and a specified herein. The lightning protection system shall be installed by a firm presently engaged in installations of Master Labeled or LPI certified lightning protection systems. The system as completed shall comply with the latest versions of the following standards.

1. Underwriters Laboratories, Inc. (UL)
   Installation Requirements for Lightning Protection Systems, UL 96A
2. National Fire Protection Association, (NFPA)
   Standard for the Installation of Lightning Protection Systems, NFPA 780
3. Lightning Protection Institute (LPI)
   Standard of Practice for the Design Installation Inspection of Lightning Protection Systems, LPI-175

B. Qualification: All installers shall be listed by UL and be a member in good standing with the LPI.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Comply with applicable requirements of section 16450, "Grounding."

B. Comply with all applicable requirements of Section 16950, "Electrical Systems Testing."

1.04 GROUND LOOP CONDUCTOR

A. General: Where indicated on the drawings or required by NFPA 780, the structure shall be provided with a below-grade continuous copper conductor counterpoise loop equal in size or greater than the largest conductor in the building lightning protection system.

B. Ground Loop: As a minimum, the ground loop conductor shall be connected to each of the following system components utilizing appropriate connections:

1. Each down conductor or steel column ground.
2. All Grounding conductors on power and communications ducts which enter the building.
3. The building electrical service ground.
4. All metallic water and gas services entering the building on owners side of meter.

5. Ground loop conductors on adjacent buildings within fifty feet.
6. Any other grounded metal body within the building or project.

1.05 SUBMITTALS

A. General: Shop drawings identifying all system wiring and component placement, including all details, shall be submitted for review. The contractor shall not perform any portion of the work until the respective submittal has been accepted. All work shall be in accordance with accepted submittal unless site conditions require a change, but in all cases, shall comply with UL 96A Master Label requirements.

B. Detail Submission: Details shall be submitted for review indicating the method of cabling connections and attachments. All details shall be appropriate for the project.

C. Transient voltage surge suppression devices: Transient voltage surge protection, if required, shall be furnished and installed by the electrical contractor. Suppression is to be provided for all incoming electric, telephone and cable services when required and shall meet U/L 96A requirements. If surge protection devices are not included in the electrical specifications, a U/L Master Label or an LPI-IP Master Certificate shall be supplied for the lightning protection system.

1.06 COORDINATION

A. Coordinate installation of lightning protection system with the installation of other building systems and components,
including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection systems, and building finishes.

B. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and installer.

C. Flashings of through – roof assemblies shall comply with roofing manufacturers' specification and installed by roofing contractor so as to not void any roofing warranties.

PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Labels: All materials used for the system installation shall comply in size, composition and weight to all requirements of NFPA, UL, and LPI for the class of system in which they are installed. All materials shall be labeled or listed by Underwriters Laboratories, Inc. for use in master labeled and/or LPI certified lightning protection systems.

B. Material: Generally, the external lightning protection system at the roof level shall be conducted of copper cable and copper compatible components. The internal lightning protection system, starting with the down conductors and concluding at the ground termination system shall be constructed of copper cable and copper compatible components. Likewise, all bonding conductors, equalpotential loop conductors, etc, shall also be constructed of compatible cable and components.

C. Compatibility: All materials shall be copper, bronze or stainless steel. Aluminum components shall be used in locations where system components are mounted to aluminum surfaces to avoid galvanic corrosion of dissimilar metals. Class I materials shall be used on structures not more than 75 feet in height. Class II materials shall be used on structures over 75 feet in height.

2.02 STRIKE TERMINATION DEVICES

A. General: Strike termination devices shall be copper as required to match the building system to which they attach.

Strike termination devices shall extend a minimum of 10 inches above the object to be protected. Center roof devices shall be 24 inches high. Strike termination device points shall be blunt with the radius of curvature equal to the rod diameter.

B. Base: Each strike termination device shall be equipped with the correct type of base for the location in which it is Mounted.

C. Roof Top Equipment: Strike termination devices and interconnecting cable shall be provided for all roof mounted equipment (fans, A/C equipment, etc.) subject to a direct strike as required by NFPA 780.

2.03 CONDUCTORS

A. General: Main roof conductors shall be copper unless otherwise specified or required.
B. Down Conductors: Down conductors shall be copper and shall be concealed in the exterior wall construction or structural columns. Down conductors shall be spaced at intervals averaging not more than 100 feet around the perimeter of the structure. If project structure is of structural steel frame construction, down conductors may be omitted and roof conductors shall be connected to the structural steel frame at intervals averaging not more than 100 feet around the perimeter of the structure. Connections to the steel frame at grade shall be made with heavy duty bonding plates having 8 square inches of contact surface or with exothermic welds at 60'on center maximum.

2.04 ROOF PENETRATIONS

A. General: Roof penetrations required for down conductors or for connecting to structural steel framework shall be made using thru-roof type assemblies with solid rods, PVC sleeves. Roof flashing shall be compatible with the roofing system and shall be provided and installed by the roofing contractor. In no case shall lightning conductors pass directly through the roof without a solid bar penetration.

2.05 COMMON GROUNDING

A. General: Common grounding of all grounded mediums within the project building shall be made by interconnecting with main size conductors and fittings as required.

B. Bonding: Grounded metal bodies located within the required bonding distance (as determined by the bonding distance formulas in NFPA 780) shall be bonded to the system using conductors and fittings.

2.06 GROUND TERMINATIONS

A. General: One ground electrode shall be provided for each down connector and shall consist of on e 5/8 inch (minimum) x 10 foot copper-clad ground rod. Each down conductor shall be connected to the ground rod using a listed lightning protection ground clamp with a minimum of 1 ½" contact or by exothermic welding.

B. General: Where the structural steel framework is utilized as the down conductor for the system, grounding electrodes shall be connected to steel columns around the perimeter of the structure at intervals averaging not more than 60 feet. Steel columns shall be grounded using bonding plates having 8 square inches of surface contact area or by exothermic welding. Conductors from the steel column connections to the ground terminations shall be full size copper lightning conductors.

2.07 FASTENERS

A. General: Conductor fasteners shall be manufactured of a material which is compatible with the type of conductor being supported. Fasteners shall be of sufficient strength to properly support each conductor or terminal base, etc.

2.08 ACCEPTIBLE MANUFACTURERS

A. Manufacturers: Thompson Lightning Protection, Inc., 901 Sibley Hwy. St. Paul, MN 55118 (800) 777-1230
East Coast Lightning Equipment, 24 Lanson Dr. Winstead, CT 06098 (888) 680-9462
HLP Systems, Inc., 426 North Ave. Libertyville, IL 60048 (800) 510-0229
ALT Fabrication, 122 Leesley Ln, Argyle, TX 76226 (800) 950-7960

B. Certified Installer: Guardian Equipment Co., 44375 Grand River Ave. Novi, MI 48375 (248) 449-5200
(info@guardianlp.com.) Fax: 248-449-5223
HLP Systems, Inc., 426 North Ave. Libertyville, IL 60048 (800) 510-0229
Michigan Lightning Protection, 2401 O'Brien St. Grand Rapids, MI 49544 (616) 453-1174

2.09 QUALIFICATIONS

A. The installing contactor of record must have a minimum of three (3) years documented experience installing LPI-175 or U/L 96A Certified Lightning Protection Systems.

B. The installation shall be installed directly by an LPI Journeyman and supervised by an LPI Master-Installer.

PART 3 – EXECUTION

3.01 INSTALLATION OF CONDUCTORS

A. General: Conductors shall be installed to interconnect all strike termination devices with the system of grounding electrodes. Conductors shall provide a minimum of at least 2 paths to ground for any strike termination device. Conductors shall provide a horizontal or downward path at all times. Conductors shall be secured to the structure at intervals not exceeding 3'- 0" on center with approved fasteners.

B. Routing: Conductors shall be routed free of excessive splices and bends. No bend of a conductor shall form an included angle of less than 90 degrees nor have a radius of bend of less than 8 inches. Cables connected to "thru-roof" connectors may rise from the roof to the connector at a maximum slope of 3 inches per foot, not exceeding 3 feet horizontally in air.

3.02 INSTALLATION OF GROUND RODS

A. General: Ground rods shall be installed a minimum of 10 feet vertically into the earth at each down conductor position at a minimum of 2 feet from the building foundation wall. When a ground loop is provided, electrodes shall be interconnected with the ground loop system. In cases where necessary, ground loops and ground electrodes may be installed within the building perimeter under the lowest level floor slab.

3.03 GENERAL WORKMANSHIP

A. General: All elements of the Lightning Protection System shall be installed in a professional and workmanlike manner consistent with the best industry practices.

B. Concealed Installation: All system components shall be concealed to the maximum extent possible to preserve the aesthetic appearance of the project building on which the system is installed.

3.04 COORDINATION WITH OTHER TRADES

A. Coordination: The contractor shall coordinate his work with all trades, to insure the use of proper materials and procedures in and around the roof in order not to jeopardize the roofing warranty.

3.05 CERTIFICATION

A. Certification: Upon completion of the installation the Contractor shall provide to the owner the Master Label Certificate issued by Underwriters Laboratories, Inc. or an LPI-IP Master Certificate for the completed installation. If the certificate cannot be provided, the installer must provide documentation in writing as to why the installation does not qualify for the Master Label certificate or the LPI IP Master Certificate.

END OF SECTION