

## **SECTION 16610 – LIGHTNING PROTECTION SYSTEM**

### **PART 1 – GENERAL**

#### **1.1 SCOPE:**

- A. Furnish and install all materials and labor required to provide a complete functional lightning protection and common ground system for the building as shown and detailed on the plans, in strict accordance with this section of the specifications and the applicable contract drawings.
- B. Completed system shall bear UL master label “C”.

#### **1.2 STANDARDS AND QUALITY ASSURANCE:**

- A. The following specifications and standards of the latest current issue form a part of this specification.
  - 1. N.F.P.A. – Code No. 780
- B. All materials for this system shall be new and the standard product of a manufacturer regularly engaged in the production of lightning protection systems and shall be of the latest approved designs. Equipment shall be approved for UL listing. All materials shall be as manufactured by Thompson Lightning Protection, Robbins, Harger, AC Lightning Security or approved equal.
- C. In order to insure integrity of installation, the system shall be installed under the direct job site supervision of Certified Master Installer.

#### **1.3 SHOP DRAWINGS:**

- A. Complete shop drawings of the entire lightning protection system showing the type, size, mounting details, and location of all equipment, grounds and cable routings, etc., shall be submitted to the Architect for approval prior to start of work. If any departures of consequence from the Approved Shop Drawings are deemed necessary by the Contractor, details thereof shall be submitted and approval obtained, before work is resumed and completed.

#### **1.4 SYSTEM:**

- A. System materials in general shall be copper and high copper-content bronze castings, and shall comply in weight, size, and composition for the class of structure to be protected, as specified in above mentioned Codes. The system shall consist of all necessary cables, air terminals, mounting bases, fittings, couplings, connectors, fasteners, etc., as required to give a complete and coordinated system. All cable and all air terminals shall bear proper UL labels.

- B. Supplier of system shall review all drawings to obtain all items required to be connected to system. Drawings show only main aspects of system. No extra compensation will be allowed for coverage and connectors required to meet NFPA 780.
- C. System conductors shall be completely concealed wherever practical. All main down-leads and roof risers shall be concealed within the building walls or columns, on new work or extensions to existing structures. Down-leads and risers to be run in 1" PVC conduit in locations shown on Shop Drawings. Down leads in steel frame buildings shall be bonded at the top and bottom. Install suitable junction boxes in conduit system for bonding taps, which shall be made with full-size conductor. Rebar steel in these columns shall be lapped a minimum of 24 diameters and ties shall be installed per A.S.T.M. standards.
- D. All system fittings except cable holders, regardless of Structure classification shall be heavy-duty type made from bronze castings and secured with bolted-pressure clamps. Pressure plates made from stamped or pressed metal parts, or fittings utilizing crimp-type pressure devices will not be allowed. All bolts, screws and related type hardware shall be stainless steel.

## PART 2 – PRODUCTS

### 2.1 MATERIALS AND EQUIPMENT:

- A. All materials shall be copper or copper alloys as described above, UL approved and labeled as required, and of the size, weight, and construction to suit the application where used in accordance with Code requirements for the Class of structure involved, and as per manufacturer recommendations.
- B. Air terminals shall be solid, ½" diameter round copper bar, full nickel plated, and of sufficient length to project 10" minimum above the object to be protected, and UL labeled. Locate and space points in accordance with L.P.I. requirements.
- C. Point bases shall be cast bronze with bolt-pressure cable connectors. Parapet type units shall provide for 1-1/2" coping overhand. Adhesive type bases for flat roofs shall be a minimum surface contact area of 18.5 square inches, and be secure with a proper adhesive.
- D. Conductors shall be braided smooth twist or rope-lay stranding commercially pure copper cable, sized per Code and UL labeled.
- E. Ground rods shall be ¾" diameter and 10'-0" long copper-clad steel, connected to system down-lead cable with two-bolt bronze clamp with stainless steel cap screws. Driven depth to be minimum of 12 feet.

- F. Cable fasteners shall be substantial in construction, compatible with the conductor and mounting surfaces, and spaced according to Code requirements.
- G. Bonding devices, cable splices, and miscellaneous connectors shall be cast bronze with bolt pressure cable connections with stainless steel hardware. Any connections between dissimilar metals shall be made with approved bi-metallic connectors or spacers.

## PART 3 – EXECUTION

### 3.1 SYSTEM DESIGN:

- A. Contractor shall have supplier of system design system in accordance with these specifications furnishing shop drawing for approval.

### 3.2 INSTALLATION:

- A. All equipment and materials shall be installed in a neat workmanlike manner by skilled installers, under the direct field supervision of a Certified Master Installer who has qualified under the LPI's Certification Program or similar installation training.
- B. System installation shall be complete; including necessary cable networks on the roof for air terminals and devices, bonding networks and taps for grounding equipment and roof metals, and down-lead conductors routed concealed in building structure to ground level. Where down-leads and risers penetrate roofs and walls, suitable ½" copper rod type thru-roof connectors shall be used, equipped with necessary lead or neoprene washers and nuts for watertight seal. Copper pitch pockets shall be used at locations with built-up roofs. Adhesive-type point bases and cable holders shall be installed on build-up roof areas before application of roof gravels.
- C. System installers shall thoroughly coordinate their work with other trades to insure a correct, neat, and unobtrusive complete installation.

### 3.3 BONDING AND SYSTEM GROUNDS:

- A. A common ground shall be provided between the lightning protection system and the building electric and telephone service grounds. In addition, all underground metallic piping systems shall be bonded with full size conductor; including water, gas, sewer, fuel oil, and any other piping system, at points where these pipes enter the building.
- B. The building electrical service shall be provided with a set of lightning surge arresters, secondary as required. Only valve type arresters will be acceptable, either single or three-phase as required.

- C. Bonding of all metallic objects and systems at roof levels and elsewhere on the structure shall be complete. Primary bonds for metal bodies of conductance shall be bonded with appropriate fittings and full-time conductor; and shall consist of but not be limited to the following: Roof exhaust fans, HVAC units with related piping ductwork, exhaust vents and any other roof piping systems, cooling towers, elevator hoist machinery supports and rails systems, window washing tracks, antenna mast for TV, radio or microwave, flag poles, roof handrails and/or decorative screens, roof ladders, skylights, metal stacks, etc. Exterior architectural metal fascia and/or curtain walls or mullions, which extend the full height of the structure, shall also be bonded, if not inherently bonded thru the building frame.
- D. Metal bodies of inductance located within six feet of a conductor or object with primary bonds, shall be bonded with secondary cable and fittings. Typical of these are: plumbing vent stacks, roof flashings, parapet coping caps, gravel guards, isolated metal building panels or siding, roof drains, down spouts, roof ventilators, exterior balcony handrails, lower level sizeable miscellaneous metals, etc.

#### 3.4 SUPERVISION AND CERTIFICATION:

- A. The manufacturer's local representative shall be a Certified Master Installer and shall provide direct jobsite technical supervision to Contractor's personnel during installation to insure compliance with all Code requirements.
- B. Upon job completion, Contractors shall furnish Owners with written certification plus UL Master Label "C", that system is installed in compliance with above Codes.

#### 3.5 SHOP DRAWINGS:

- A. Shop drawings as-built with certifications by master installer shall be turned over at close out.

END OF SECTION 16610