SECTION 16670

LIGHTNING PROTECTION SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The work covered by this section of the specifications consists of furnishing all labor, materials and items of service required for the completion of a functional and unobtrusive lightning protection system as approved by the architect, and in strict accordance with this section of the specifications. Objective of this specification is to provide safety for the building and occupants by preventing or mitigating damage to building structure caused by lightning.

B. **If any departure from these Performance Specifications and/or the approved submittal drawings are deemed necessary by the Contractor, details of such departures and reasons therefore shall be submitted as soon as practicable to the architect for approval. No such departures shall be made without the prior written approval of the architect.**

C. Requirements for lightning protection system components include, but are not limited to, the following:

1. Conductors.
2. Air Terminals.
3. Connectors.
4. Splices.
5. Grounding rods.
6. Grounding plates.
7. Bonding plates.
8. Fasteners.

1.2 RELATED DOCUMENTS

A. Drawings

B. General provisions of Contract, including General and Supplementary Conditions.

C. Division 01 - Specification Section.

D. Section 16010 - General Provisions.

1.3 QUALITY ASSURANCE

A. The lightning protection system shall conform to the requirements of the Lightning Protection Institute (LPI) Installation Standard LPI 175, NFPA Standards for Lightning

Protection Systems NFPA 780, and Underwriters Laboratories Installation Requirements UL96A.

B. The system to be furnished under this specification shall be the standard product of a manufacturer regularly engaged in the production of lightning protection systems and shall be the manufacturer's latest approved design. The equipment shall be U.L. listed and properly UL labeled. Manufacturer shall be a fully certified member in good standing of the Lightning Protection Institute.

1.4 SUBMITTALS

A. Complete shop drawings showing the type, size, and locations for all equipment, grounds, and cable routings, etc., shall be submitted to the architect for approval prior to start of work.

B. UL Certificate: Provide Owner with UL Master Label for overall system which is suitable for fastening to building for display.

PART 2 - PRODUCTS

2.1 STANDARD

A. All equipment used in this installation shall be factory inspected, approved and properly labeled in accordance with UL and LPI requirements.

B. All equipment shall be new, the product of a single manufacturer, and of a design and construction to suit the application where it is used in accordance with accepted industry standards and Code requirements.

2.2 ACCEPTABLE MANUFACTURERS: Subject to compliance with requirements, provide lightning protection products by one of the following:

A. Advanced Lightning Technology - Texas

B. Heary Brothers Lightning Protection

C. East Coast Lightning Equipment - Connecticut

D. Robbins Lightning Protection Co.

E. Thompson Lightning Protection, Inc. - Minnesota

2.3 LIGHTNING PROTECTION SYSTEM EQUIPMENT

A. All materials shall be copper and bronze and of the size, weight, and construction to suit the application where used in accordance with LPI, UL, and NFPA Code requirements. Class I sized components may be utilized on roof levels 75 feet and below in height. Class

II sized components are required for roof levels over 75 feet in height. Bolt type connectors and splices shall be used on Class I and Class II structures. Pressure squeeze clamps are not acceptable. All mounting hardware shall be stainless steel to prevent corrosion.

B. Aluminum Components: Aluminum materials shall be used on roofs that utilize aluminum, galvalume or galvanized metal roofing components. On aluminum, galvalume or galvanized metal roofs where aluminum, galvalume or galvanized metal parapet caps exist, the entire roof lightning protection equipment shall utilize aluminum components to insure compatibility. However, the down leads and grounding are to utilize copper with the bimetal transition occurring at the through roof assembly with an approved bimetal through roof assembly.

C. Copper conductors shall be 29 strands, 17 gauge, 190 lbs. per 1000 ft. minimum for roof and main conductors. Down conductors shall be copper of 24 strands, 14 gauge, 320 lbs. per 1000 ft.

D. Copper air terminals shall be solid, round copper bar of 3/8" minimum diameter and shall project 10" minimum above the object to be protected. Locate and space according to LPI, UL and NFPA requirements.

E. Air terminal bases shall be of cast bronze with bolt pressure cable connections and shall be securely mounted with stainless steel screws or bolts. Crimp type connectors are not acceptable. Bases on built-up tar and gravel roofs shall be secured with a proper adhesive and shall have a minimum surface contact area of 18.5 sq. inches.

F. Ground rods shall be a minimum of 5/8" in diameter and 10'-0" long. They shall be connected to the system with a two-bolt cast bronze clamp, having a minimum length of 1-1/2" and employing stainless steel cap screws, or shall be exothermically welded.

G. Cable fasteners shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to LPI and NFPA Code requirements.

H. Bonding devices, cable splices and miscellaneous connectors shall be of cast bronze with bolt pressure connections to cable. Cast or stamped crimp fittings are not acceptable.

I. All miscellaneous bolts, nuts and screws shall be brass, bronze or stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION OF LIGHTNING PROTECTION SYSTEMS

A. Install lightning protection systems in accordance with equipment manufacturer's written instructions, in compliance with applicable requirements of NFPA 780 standards, LPI-175, and UL 96A standards.

B. The installation shall be accomplished by an experienced installer who is a Certified Master Installer of the LPI or working under the direct supervision of an LPI manufacturer as listed above or his authorized LPI Certified Master Installer representative.

C. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible. The system shall consist of a complete cable network involving all air terminals, connectors, splices, bonds, copper down leads, and proper ground terminals. Down leads shall be concealed in the building construction. Down lead cables shall not be brought directly through the roof. Thru-roof assemblies with solid brass or stainless steel rods shall be utilized for this purpose.

D. Copper equipment shall not be connected to aluminum surfaces except by means of an LPI approved bimetal transition fitting. Lead coating is not to be accepted as a bimetal transition.

E. Install conductors with direct paths from air terminals to ground connections avoiding sharp bends and narrow loops.

F. Install arresters as close as practical to equipment they are protecting.

G. Conceal system wiring.

H. Conceal down conductors.

I. Conceal interior wiring.

J. Conceal wiring from normal view from all exterior locations at grade within 200-feet of building.

K. Splices and Clamps: Use approved exothermic welded connections for all conductor splices and all connections between conductors and other components.

L. All air terminals routed along the parapet wall shall be mounted to the inside wall, not on top of the parapet.

3.2 CORROSION PROTECTION: Use no combination of materials that may form an electrolytic couple of such nature that corrosion is accelerated in the presence of moisture, unless moisture is permanently excluded form the junction of such metals. Where unusual conditions exist that would cause deterioration or corrosion of conductors, use conductors with suitable protective coatings.

3.3 GROUNDING AND BONDING: Provide equipment grounding and bonding connections sufficiently tight to assure permanent and effective grounds and bonds.

3.4 COORDINATION

A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.

B. Responsibility for sealing and flashing all lightning protection roof penetrations shall be with the roofing (sub)contractor, in accordance with the roof manufacturer's recommendations. However, the lightning protection subcontractor shall be required to coordinate through roofs and submit details of through roof penetrations as required. The lightning protection subcontractor shall furnish and install the adhesive and obtain an approval of the compatible adhesive from the roof manufacturer / (sub)contractor prior to the installation. Should the roofing manufacturer/(sub)contractor require any special walk pads, membrane patches, pavers, etc. under the components of the lightning protection system, it shall be the responsibility of the roofer to furnish and install such items. The lightning protection installer shall be responsible for marking the roof with all conductor and/or pad locations.

C. It shall be the responsibility of the lightning protection system installer to assure a sound bond to the main water service and to assure interconnection with other ground systems.

D. All down leads shall be routed concealed in conduit in the interior side of the outside walls of the building. Coordinate with Division 1.

E. Down leads are to turn outside, below grade to the ground rods. Seal all penetrations; coordinate with Division 1, Division 7 and Section 16735.

F. It shall be the responsibility of the lightning protection installer to assure a sound bound to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical. Proper arresters shall be installed on the power and telephone service.

3.5 COMPLETION

A. Upon completion of the installation, the lightning protection installer shall secure and deliver to the Architect for the owner the UL Master Label Certification and the Lightning Protection Institute (LPI) Certified System certification. The system will not be accepted without the UL Master Label plate and the LPI certification certificate.

B. The Contractor shall also submit copies of as-built shop drawings with LPI Forms LPI-C1-01, -02, and -03 to finalize the LPI Certified System Application.

3.6 FIELD QUALITY CONTROL

A. Perform inspections of the lightning protection system installation in accordance with LPI-177, "Inspection Guide for LPI Certified Systems." Provide Architect with one copy of LPI-177 and retain one copy at the project site throughout construction for reference.

B. Document the inspections on LPI forms LPI-C1-02 and LPI Form 1-R88. Provide one copy of each completed form to the Architect.

C. Provide advance notice of at least 24 hours to the Architect before concealing lightning protection system work.

D. Provide UL inspection and delivery of UL Master Label "C" to the Architect.

END OF SECTION