

Specification – Lightning Protection System

General:

Summary –

- A) This Section specifies the lightning protection system for the building(s) or structure(s). This system provides safety for the building and occupants by preventing damage to the structure caused by lightning. The design of this system is to be in strict accordance with this section of the specification and all contract drawings that apply.
- B) The work covered under this section of the specifications consists of furnishing labor, materials and services required for the completion of a functional and unobtrusive lightning protection system approved by the architect and engineer.
- C) A firm actively engaged in the installation of Certified lightning protection systems and listed with Underwriters' Laboratories, Inc. and the Lightning Protection Institute shall install the system.

System Description –

The entire lightning protection system shall be designed and installed in accordance with:

- A) National Fire Protection Assoc. (NFPA) Document # 780
- B) Underwriters' Laboratories, Inc. (UL) Standard # 96A
- C) Lightning Protection Institute (LPI) Standard # 175

Submittals –

A complete shop drawing shall be submitted to the architect and engineer for approval prior to commencement of the installation. The shop drawing will show the extent of the system layout designed for the structure along with details of the products to be used in the installation.

Quality Assurance –

- A) The contractor shall furnish a UL Master Label or Letter of Findings upon completion of the installation.
- B) The system installation shall be made under the supervision of an LPI Certified Master Installer, and the LPI System Certification shall be delivered upon completion of the installation.

Products:

Standard –

All materials shall comply in weight, size, and composition with the requirements

of the UL 96 Materials Standards. All equipment shall be UL listed and properly labeled. The system furnished under this specification shall be the standard product of a manufacturer regularly engaged in the production of lightning protection equipment and a member of LPI. Equipment shall be the manufacturer's latest approved design of construction to suit the application where it is to be used in accordance with accepted industry standards and with NFPA, LPI, & UL requirements.

Acceptable Manufacturers –

East Coast Lightning Equipment, Inc. (www.ecle.biz)
ERICO, Inc. (www.erico.com)
Harger, Inc. (www.harger.com)
Heary Brothers Lightning Protection Co., Inc. (www.hearybros.com)
Independent Protection Company, Inc. (www.ipclp.com)
Preferred Lightning Protection (www.preferredlp.com)
Robbins Lightning, Inc. (www.robbinslightning.com)
Thompson Lightning Protection, Inc. (www.tlpinc.com)

Materials –

- A) Class I materials shall be used for systems on structures not exceeding 75 feet in height and Class II materials shall be used for systems on structures exceeding 75 feet above grade.
- B) Copper shall be of the grade ordinarily required for commercial electrical work, generally designated as being 95 percent conductive when annealed. Aluminum conductors shall be of electrical grade aluminum.
- C) Lightning protection materials shall be coordinated with building construction materials to assure compatibility. Aluminum lightning protection materials shall not be embedded in concrete or masonry, installed on or below copper surfaces, or used for the in-ground system. Copper lightning protection materials shall not be installed on aluminum surfaces. Copper system components within 2 feet of chimney exhausts shall be tin coated to protect against deterioration.
- D) Strike termination devices shall be provided to place the entire structure under a zone of protection as defined by the Standards. Air terminals shall project a minimum of 10 inches above protected areas or objects. Air terminals shall be located within 2 feet of exposed corners and roof edges.
- E) Metallic bodies having a thickness 3/16" or greater may serve as strike termination devices without the addition of air terminals. These bodies shall be made a part of the lightning protection system by connection(s) according to the Standards using main size conductors and bonding fittings with 3 square inches of surface contact area.
- F) Cable conductors shall provide a two-way path from strike termination devices horizontally and downward to connections with the ground system. Cable conductors shall be free of excessive splices and sharp bends. No bend of a conductor shall form a final included angle of less than 90 degrees nor have a radius of bend less than 8 inches. Structural elements and design features shall

be used whenever possible to minimize the visual impact of exposed conductors.

- G) Cable down conductors may be concealed within the building construction or enclosed within PVC conduit from roof to grade level. Down conductors shall be spaced at intervals averaging not more than 100 feet around the protected perimeter of the structure. In no case shall any structure have fewer than two down conductors. Where down conductors are exposed to environmental hazards at grade level, guards shall be used to protect the conductor to a point 6 feet above grade.
- H) In the case of structural steel frame construction, cable 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 protected perimeter of the structure.
- I) Exposed cable conductors shall be secured to the structure at intervals not exceeding 3 feet – 0 inches. Fasteners, nails, screws, or bolts shall be of suitable configuration for the intended application and of the same material as the conductor or of electrolytically compatible materials. Galvanized or plated steels are not acceptable.
- J) Connectors and splicers shall be of suitable configuration and type for the intended application and of the same material as the conductors or of electrolytically compatible materials.
- K) Ground terminations suitable for the soil conditions shall be provided for each downlead conductor. Where the structural steel framework is utilized as main conductors for the system, perimeter columns shall be connected to the grounding system at intervals averaging 60 feet or less on the protected perimeter. For any structure in excess of 60 ft. in vertical elevation above grade, a ground loop interconnecting all ground terminals and other building grounded systems shall be provided.
- L) Common interconnection of all grounded systems within the building shall be accomplished using main size conductors and fittings. Grounded metal bodies located within the calculated bonding distance as determined by the formulas of the Standards shall be bonded to the system using properly sized bonding conductors.
- M) Surge suppression shall be provided at every system entrance to the structure to prevent massive lightning overvoltages from entering the structure. Additional surge protection for internal electronic equipment may be determined through cost-benefit analysis by a trained engineer.

Execution:

Standard –

The installation shall comply with the requirements of NFPA 780, UL 96A, and LPI 175.

Acceptable installers –

The installing contractor company shall be listed with the Lightning Protection Institute, and Underwriters' Laboratories, Inc. The installation contractor shall have personnel on staff Certified by the LPI as a Master Installer or Master Installer – Designer of lightning protection systems. LPI qualified staff shall provide supervision of the installation to the Standards.

Installation –

- A) The installation of the lightning protection system components shall be done in a neat and workmanlike manner.
- B) Roof penetrations required for down conductors or for connections to structural steel framework shall be made using through-roof assemblies with solid bars and appropriate roof flashings. The roofing contractor shall furnish the methods and materials required at roofing penetrations of the lightning protection components and any additional roofing materials or preparations required by the roofing manufacturer for lightning conductor runs to assure compatibility with the warranty for the roof.

(Note: The roofing contractor will be responsible for sealing and flashing all lightning protection roof penetrations as per the roof manufacturer's recommendations. The lightning protection roof penetrations and/or method of conductor attachment should be addressed in the roofing section of the specifications.)

- C) LPI certification requires a signature by a representative of the owner at three stages of installation – the in-ground system, the concealed portion of the work, and the exposed or roof level section. UL certification requires inspection by their third-party field staff after completion of the installation. Upon completion of the lightning protection installation, the installing contractor shall provide to the owner an as-built drawing of the system, along with copies of the UL and LPI Certificates of completion.
- D) If the protected structure is an addition to or is attached to an existing structure that does not have a lightning protection system, the contractor shall certify that the system installed complies with the requirements of the Standards, and advise the owner of the lightning protection work required on the existing structure to obtain full certification for the structure. If the existing structure does have a lightning protection system, the contractor shall advise the owner of any additional work required on the existing system to bring it into compliance with current Standards and thus qualify for UL and LPI certification.