

SECTION 26 41 13

~~~ PROJECT NOTE ~~~~~

ARCHITECT OF RECORD/ENGINEER OF RECORD IS RESPONSIBLE FOR REVIEWING THIS SPECIFICATION SECTION IN DETAIL FOR COORDINATION WITH THE PROJECT SCOPE OF WORK.

ALL "PROJECT NOTE" TEXT IS TO BE REMOVED FOLLOWING REVIEW OF THE CONTENT OF EACH NOTE BY THE ARCHITECT OF RECORD/ENGINEER OF RECORD.

EDIT THE DOCUMENT FOOTER TO INCLUDE THE PROJECT NAME AND NUMBER.

EDIT THE DOCUMENT HEADER TO INDICATE THE ARCHITECT OF RECORD PROJECT ISSUE" DATE. THE "CPS CONTROL" DATE SHOULD NOT BE EDITED.

ANY MODIFICATIONS TO THE TECHNICAL STANDARDS IN THIS SECTION - INCLUDING THE REMOVAL OR ADDITION OF MANUFACTURERS - MUST BE APPROVED BY CPS.

REQUESTS FOR MODIFICATION ARE TO BE SUBMITTED TO THE DESIGN MANAGER DURING THE DESIGN PHASE FOR REVIEW AND APPROVAL.

~~~ END OF PROJECT NOTE ~~~~~

LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

PART 2 -

~~~ PROJECT NOTE ~~~~~

TYPICAL LIGHTNING PROTECTION SPECIFICATIONS. EDIT ALL EQUIPMENT, DEVICES, AND SECTIONS FOR PROJECT SCOPE.

~~~ END OF PROJECT NOTE ~~~~~

2.01 SECTION INCLUDES

- A. Provide UL master label listed lightning protection system including but not limited to:
 - 1. Strike (air) terminals and interconnecting conductors.
 - 2. Grounding and bonding for lightning protection.

2.02 REFERENCE STANDARDS

- A. City of Chicago Building Code - Municipal Code of Chicago for the Building Industry; 2017.
- B. Chicago Electrical Code - Municipal Code of the City of Chicago, Building/Electrical Code Requirements; 2018.
- C. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2017.
- D. UL 96 - Lightning Protection Components; Current Edition, Including All Revisions.
- E. UL 96A - Standard for Installation Requirements for Lightning Protection Systems; Current Edition, Including All Revisions.

2.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination with Concrete Work: Coordinate the embedding of lightning protection components in concrete.
- B. Coordination with Roofing Work: Ensure adequate attachment of strike terminals and conductors without damage to roofing.
- C. Preinstallation Meetings:
 - 1. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section; require attendance by all affected installers.
 - 2. Ensure required submittals have been provided with sufficient time for review prior to scheduling the preinstallation meeting.
 - 3. Review the detailed requirements for the work of this section and to review the drawings and specifications for this work. Require attendance by all affected installers including but not limited to:
 - a. Contractor's Superintendent.
 - b. Installer.
 - c. Manufacturer/Fabricator Representative.
 - d. Other affected Subcontractors.
 - e. Architect/Engineer of Record.
 - f. Board's Representative.
 - 4. Record minutes and distribute copies within five (5) days after meeting to participants as well as Architect/Engineer of Record, Board and those affected by decisions made.

2.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate location and layout of air terminals, grounding electrodes, and bonding connections to structure and other metal objects. Include terminal, electrode, and conductor sizes, and connection and termination details.
 - 1. Where conductors or grounds are to be embedded or concealed in other construction, submit shop drawings at least 30 days prior to start of construction.
 - 2. If concrete-encased grounds are to be used and are not shown in the contract documents, provide sufficient data to determine concrete encasement dimensions and location.
 - 3. Include data on actual ground resistance determined by field measurement in accordance with NFPA 780.
 - 4. Include engineering analysis of equalization of potential to metal bodies within the structure.
 - 5. Include access panels, test holes, and disconnecting means for maintenance.
 - 6. Include roof attachment details, coordinated with roof installation.
- C. Product Data: Provide dimensions and materials of each component, indication of testing agency listing, and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Installation Certification: Submit copy of certification agency's approval.
- F. Operation and Maintenance Data: Provide recommended inspection and testing plan, including recommended intervals, to achieve periodic maintenance as recommended in NFPA 780; provide customized plan reflecting actual installation configuration with specific installed components identified.

- G. Project Record Documents: Record actual locations of air terminals, grounding electrodes, bonding connections, and routing of system conductors in project record documents.

2.05 QUALITY ASSURANCE

- A. Maintain one copy of each referenced system design standard on site.
- B. Manufacturer Qualifications: Company specializing in lightning protection equipment with minimum three years documented experience.
- C. Designer Qualifications: Person or entity, employed by installer, who specializes in lightning protection system design with minimum three years documented experience.
- D. Installer Qualifications: Capable of providing the specified certification of the installed system.
 - 1. UL-listed installer, category OWAY.
 - 2. Engage an experienced installer who is an NRTL or who is certified by LPI as a Master Installer/Designer.
- E. Products: Listed, classified, and labeled as suitable for the purpose intended.
 - 1. The Terms "Listed and Labeled": As defined in Chicago Electrical Code.
 - 2. Listing and Labeling Agency Qualifications:
- F. Comply with NECA's "Standard of Installation".
- G. Comply with Chicago Electrical Code.
- H. Obtain a UL Lightning Protection Inspection Certificate stating that the lightning protection system meets Underwriters Laboratories, Inc. criteria for the completed installation.
- I. LPI Compliance: Comply with requirements of Lightning Protection Institute (LPI) Standards 175, 176, and 177, pertaining to lightning protection system material, components, installation, and quality assurance procedures.

PART 3 - PRODUCTS

3.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
 - 1. Lightning Protection Components:
 - a. Harger Lightning and Grounding: www.harger.com.
 - b. ERICO International Corporation: www.erico.com.
 - c. Thompson Lightning Protection, Inc.: www.tlpinc.com.

3.02 LIGHTNING PROTECTION SYSTEM

- A. Lightning Protection System:
 - 1. Comply with NFPA 780 requirements for Class I structures not exceeding 75 feet, and Class II structures exceeding 75 feet.
 - 2. Comply with UL 96A requirements for Class I structures not exceeding 75 feet, and Class II structures exceeding 75 feet.
 - 3. Listed and labeled by a qualified testing agency as complying with UL 96, and marked for intended location and application.
 - 4.

~~~ PROJECT NOTE ~~~~~

**ADJUST PROTECTED ITEMS AND EQUIPMENT FOR PROJECT SCOPE.**

**~~~ END OF PROJECT NOTE ~~~~~**

5. Provide system that protects:
  - a. The entire structure.
  - b. Open air areas within 100 feet of exterior walls at grade level.
  - c. Open air areas within building footprint.
  - d. Trees identified on site plan.
  - e. Metal fences identified on site plan.
  - f. Aboveground metal water tank (grounding only).
  - g. Aboveground concrete water tank.
  - h. Metal communications towers (grounding only).
6. Treat isolated non-grounded protruding metal items as specified by NFPA 780 for heavy-duty stacks.
7. Determine ground resistance by field measurement.
8. Provide copper, bronze, or stainless steel components, except where aluminum is allowed by NFPA 780.
9. Provide disconnecting means and access panels or similar devices to allow complete periodic inspection and testing as described by NFPA 780 Annex D.
10. Provide system certified by Underwriters Laboratories or the Lightning Protection Institute.

**3.03 COMPONENTS**

- A. All Components: Complying with applicable requirements of UL 96.
- B. Air Terminals:
  1. Copper unless otherwise indicated.
  2. Size: As indicated on drawings.
  3. Rounded tip.
  4. Threaded base support.
- C. Class 1 Main Conductors:
  1. Stranded Copper: 57,400 circular mils in diameter.
  2. Aluminum: 98,600 circular mils in diameter.
- D. Class II Main Conductors:
  1. Stranded Copper: 115,000 circular mils in diameter.
  2. Aluminum: 192,000 circular mils in diameter.
- E. Ground Loop Conductor: Solid copper..
- F. Ground Rods: As specified in Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- G. Conductor Splices and Connectors: Compression fittings that are installed with hydraulically operated tools, or exothermic welds, approved for use with the class type.

**PART 4 - EXECUTION**

**4.01 EXAMINATION**

- A. Verify that field measurements are as indicated on shop drawings.
- B. Coordinate work with installation of roofing and exterior and interior finishes.

C.

~~~ PROJECT NOTE ~~~~~

VERIFY INSTALLATION OF EQUIPMENT, CONNECTIONS, AND CABLE AS REQUIRED FOR PROJECT SCOPE OF WORK.

~~~ END OF PROJECT NOTE ~~~~~

#### 4.02 INSTALLATION

- A. Install lightning protection components and systems according to UL 96A and NFPA 780.
- B. Connect conductors using mechanical connectors or exothermic welding process; protect adjacent construction elements and finishes from damage.
- C. Install conductors with direct paths from air terminals to ground connections. Avoid bends less than 90 degrees and 8 inches in radius and narrow loops.
- D. Conceal conductors within normal view. Comply with requirements for concealed installations in UL 96A and concealed systems in NFPA 780.
  - 1. Roof penetrations required for down conductors and connections to structural-steel framework shall be made using listed through-roof fitting and connector assemblies with solid rods and appropriate roof flashings. Use materials approved by the roofing manufacturer for the purpose. Conform to the methods and materials required at roofing penetrations of the lightning protection components to ensure compatibility with the roofing specifications and warranty.
  - 2. Install conduit where necessary to comply with conductor concealment requirements.
  - 3. Air Terminals on Single-Ply Membrane Roofing: Comply with adhesive manufacturer's written instructions.
- E. Ground Ring Electrode: The conductor shall be not less than the main-size lightning conductor.
- F. Aboveground concealed connections, and connections in earth or concrete, shall be done by exothermic welds or by high-compression fittings listed for the purpose.
- G. Aboveground exposed connections shall be done using the following types of connectors, listed and labeled for the purpose: exothermic weld.
- H. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
- I. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.
- J. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.

#### 4.03 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.

- B. Perform visual inspection as specified in NFPA 780 as if this were a periodic follow-up inspection.
- C. Perform continuity testing as specified in NFPA 780 as if this were testing for periodic maintenance.
- D. Obtain the services of the specified certification agency to provide inspection and certification of the lightning protection system, including performance of any other testing required by that agency.
  - 1. Perform inspections as required to obtain a UL Master Label for system.
  - 2. Provide an inspection by an inspector certified by LPI to obtain an LPI certification.
  - 3. Upon completion of inspections, obtain and submit master label certificate.

**END OF SECTION 26 41 13**