

UL 96A
LIGHTNING PROTECTION INSTALLATIONS
(OWAY)
FOLLOW-UP AND INSPECTION INSTRUCTIONS

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SCOPE

- A. Scope:
1. These instructions are intended to cover the inspection of lightning protection installations to determine compliance with the applicable requirements.
 2. The standard covering the evaluation requirements of lightning protection installations is: UL96A thirteenth edition, The Standard for Installation Requirements for Lightning Protection Systems.
 3. UL will also inspect structures with lightning protection systems installed to the requirements of national, international, government, or published standards other than UL 96A (such as NFPA 780, IEC 62305 1-4, and various Government and Military standards.)
 4. The UL inspection program for Master Label Certificate and Letters of Findings allow the omission of surge protective devices. Please see "Surge Protection" section below for details.

GENERAL

B. As part of UL Inspection Services Program, it is required that members of the UL Field Engineering Team inspect lightning protection system installations to determine compliance with UL's requirements. This inspection includes the entire scope of the certification at the time of inspection.

PROCEDURE IN CASE OF NONCOMPLIANCE

C Installations that are not in compliance with the standard are issued a non-compliance report. Items corrected at the time of inspection shall be noted on the application in the comment section "Item (s) corrected during inspection" (located in create inspection data) and do not need to be separately documented on a non-compliance report. Clearly state the non-compliance(s) and corrective action(s) taken.

D When the inspection is complete the installer will be given the option of receiving a non-compliance report to end the inspection or if there are minor repairs that can be corrected during the inspection, these items can be reinspected without the issuance of a non-compliance report. If the corrections cannot be made during the inspection, then a non-compliance report would be issued.

E Each item cited on the non-compliance report shall reference a specific paragraph in the applicable standard. The location of each non-compliant item shall be identified in the non-compliance report.

F A non-compliance report is the completion of the inspection. When corrections are made and a reinspection is required, the installer will need to apply for a new inspection by resubmitting the original LPS application that was first requested through the UL LPS on-line web application.

G Clients have the right to appeal. If the installer disagrees with the non-compliance(s), the UL Field Engineer shall contact the UL Lightning Protection System Program Technical Advisor regarding the appeal for further direction.

H After non-compliance reports are issued, the installer has two options to complete the inspection.

1. The first option is to have a physical reinspection.
2. The second option is to resubmit the application and include both before and after photos of each non-compliance. The photo(s) detail, angles, and description of the photos should be discussed with the Field Engineer so the areas of concern in the non-compliance report are visible. An onsite reinspection will be required if alterations are not easily identifiable in the photographs. All of the following criteria must be met for using the photo review inspection option:
 - a. This process does not apply for any military installation
 - b. A maximum of six different non-compliant items may be reviewed
 - c. Photographs shall be submitted within 30 business days of the initial inspection
 - d. Photographs must be identified by file name to show before and after shots of the corrections and are identified as such. Multiple photos may be included in one document (PDF/Word/Excel) as long as each photo is clearly labeled.

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- e. Photographs shall be clear, identifiable and marked with a description of the non-compliance
 - f. Photographs shall not exceed 1 MB is size, and shall be attached to your resubmitted application

UL ENGINEER'S INSPECTION INSTRUCTIONS

(This sections paragraph references correspond to sections of UL96A therefore L1.1 provides additional guidance on UL96A paragraph 1.1. There will not be a reference for each standard paragraph.)

SCOPE

L1.1 Structures are any permanent construction anchored in the ground (earth).

L1.3 The Master Label® Certificate may be issued for a system on a structure that is connected to an unprotected structure when all of the following conditions apply:

- There is a physical separation between the structures
- When utilizing a physical separation between structures the only connection allowed is flashing or expansion joints used to keep moisture and debris out of the separations
- There is a dividing wall or a firewall as described in section L1.4
- The only connection is a covered walkway or awning as outlined in section L1.6

L1.4 Buildings separated by a dividing wall or firewall.

The dividing wall or firewall is considered a legal separation for structure sections. A system that is installed on a portion of the building with a dividing wall or firewall separation shall be installed in accordance with the applicable standard and must be a complete system. A structure is considered separated when evidence of a dividing wall or firewall is in place and all of the following conditions are in place:

- The dividing wall or firewall must extend from the foundation to the roof.
- The dividing wall or firewall separation is treated the same as any exterior wall around the structure
- All grounded metallic objects that extend through the wall must be bonded as required in the common bonding section of the applicable standard
- All electrical circuits passing through the wall must have surge protection as required by the applicable standard
- Air terminal placement must be as specified for the perimeter, independent of any surrounding or adjacent portions of the existing structure
- All down conductors and number of grounding points must be as specified for the perimeter, independent of any surrounding or adjacent portions of the existing structure
- The installer provides verifiable dividing walls or firewall documentation that corresponds to the construction of the wall system. (This should be attached to the application to minimize any confusion prior to the inspection)

L1.5 Adjacent Structures

- The UL Master Label Certificate Inspection Program requires an individual certificate (or Letter of Findings, as applicable) for each structure. Some examples of adjacent structure are generators, cooling towers, tanks, etc. If these types of structures are contained within an equipment yard that has a fence or wall surrounding it and attached to the main structure and the fence or wall is protected it may be included as part of the structure being protected. In these cases, the name of the structure on the application should indicate "Building X Including Equipment Yard"

L1.6 Structures Attached by Walkways

The structure may “include” or “exclude” a walkway depending on the locations of the dividing wall, firewall, or physical separation. The lightning protection program defines walkways as any connection between buildings that is:

- Enclosed or open roof section structurally connected, or free-standing roof section not requiring the structure for support but attached to the structure with flashing or expansion joints
- Elevated section of a walkway with or without roof covering structurally connected, or free-standing roof section not requiring the structure for support but attached to the structure with flashing or expansion joints
- Elevated enclosed walkway structurally connected or totally free-standing enclosed walkway not requiring a portion of the structure for support
- Concrete walks on the ground between buildings are not considered walkways for lightning protection purposes

When an installer is requesting a certification for a structure connected by covered or elevated walkways intending to be included in the certification they must be:

- In a zone of protection from the main structure or be provided a zone of protection
- Reflected in the perimeter footage of the structure by the installer on the application request
- Be defined by the installer in the description of the structure named on the application request for example (Building X including walkway on side Y)

When an installer is requesting a certification for a structure connected by covered or elevated walkways intending to be excluded in the certification they must be:

- Defined by the installer in the description of the structure's name on the application request for example (Building X excluding walkway on side Y)
- Be considered independent structures regardless of the size, shape, and how they are connected to the structure, even if considered not free standing, (that is) requiring the structure for support

When an installer is requesting a certification for a walkway as an independent structure, it will be required to meet the requirements in the standard for a complete system, which will include the following:

- The structure will be evaluated independent of surrounding structures
- If the walkway contains an electrical service of any size, main sized bonding and surge protection as specified in the applicable standard must be provided

L1.9 Generators

Generators used for emergency power applications in industrial, commercial, or residential use are eligible for inclusion within the scope of the inspection.

COMPONENTS

L2.5 Components utilized in the installation of a lightning protection system covered by the UL 96A standard shall comply with the Standard for Lightning Protection Components, UL 96 or other applicable UL Standards. Evidence of compliance will be a UL Listing or UL Recognized Component certification by UL in accordance with the applicable product certification requirements.

STRIKE TERMINATION DEVICES

L8.1.3 When this clause is utilized to expand spacing for protected areas covered by Section 8.1.5 and all of Section 8.2.2. the installer must provide detailed drawings (with dimensions) that clearly illustrate how the area is placed in the zone of protection utilizing Section 8.2.3. If the installer is unable to produce drawings that will show the establishment of a zone of protection then they must provide calculations that show how the zone was established. The drawings and/or calculations shall be attached to the inspection application by the installer prior to the inspection. When these requirements are applied to the structure no additional calculations are required. When 8.1.3 is applied to expand these requirements then the requirements in L8.1.3 must be followed.

ZONE OF PROTECTION

L8.2.2.2 This applies when there are no projections in the open area. If there are projections they must be protected using the requirements in section 8.2.3.

PROTECTION OF DOWN CONDUCTOR

L9.3.3 Down conductors located in areas that may be subject to physical damage are required to be protected. This includes any areas subject to lawn maintenance. Protection by means of PVC conduit does not require the use of UL Listed conduit, however electrical grade conduit is recommended to ensure UV properties.

GROUNDING

L10.1.3 Loop conductor or trenched electrode buried in the ground (provided by the electrical contractor) that is not Listed lightning protection conductor shall comply with the construction specifications in Tables SA 1.1 and SA 1.2 in UL 96A and Tables 9.1, 9.2 and 19.1 in UL96 for the strand diameter.

Refer to Table 20.1, in UL 1581 for the conductor strand parameters for each AWG size.

Ground Ring Electrode Cable and Bonding Conductor Size for LPS

	Class I	Class II
Main Conductor (ground ring)	# 2 AWG	2/0 AWG
Bonding Conductor	# 6 AWG	# 6 AWG

COMMON GROUNDS

L10.4.2 The term “or other systems” is referring to water service, gas piping, underground conduits, underground-liquefied petroleum gas piping systems, sprinkler systems, fuel oil lines, tank and tank lines, and similar piping systems. If the grounding system is utilizing metal water piping (as described in the standard) for the common ground for all other services, there needs to be only one bonding connection made with main size conductor and LP Listed main size connectors from the metal water piping to the LPS. All other connections to the water piping system from each service may be made with electrical grade conductors and connectors sized appropriately for that system.

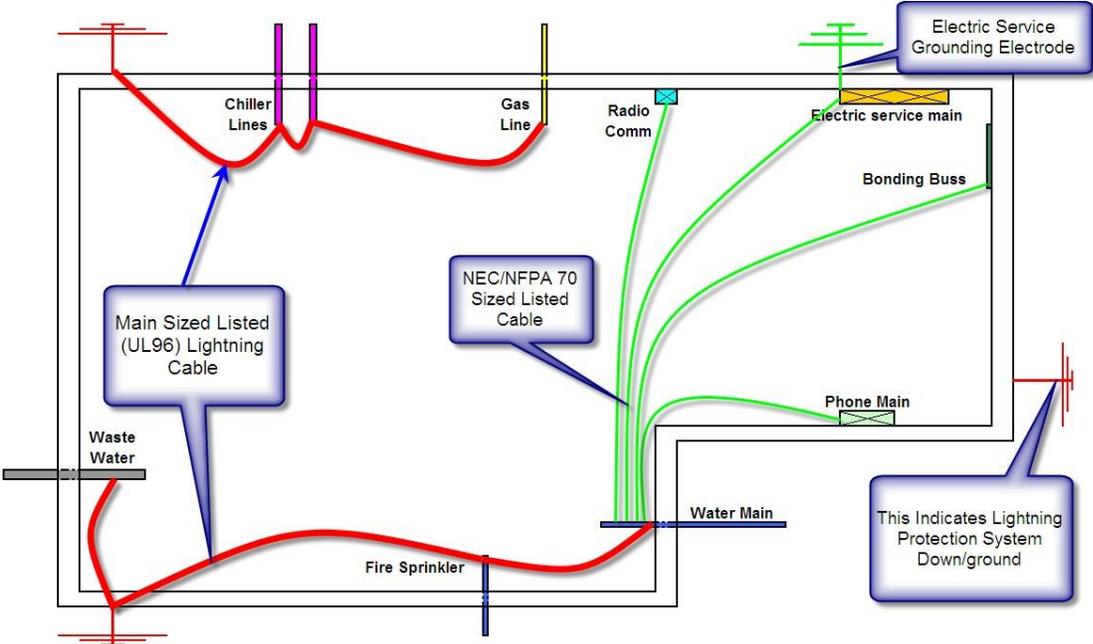
Alternatively, If electric, telephone or other systems are grounded to a section of metallic water pipe, only one bonding connection, using main size conductors and main size connectors from the water pipe system to the lightning protection system is required provided the water pipe is electrically continuous between all systems. If it is not electrically continuous because of the use of plastic pipe sections or for other reasons, the nonconductive sections shall be bridged with main-sized conductors, or the bonding connections shall be made at a point where there is electrical continuity. When the building grounded systems noted above are interconnected at a common accessible point in or on the structure, the lightning protection system shall have a main size conductor and 3 in² bonding connector or a minimum of 1-1/2 in (38 mm) of contact along the axis of a round surface connected to the common bonding point. This common bonding point shall include a ground bar, or the metallic structural frame per NFPA 70. Connections between the grounded services and the ground bus bar connection needs only to be sized as specified in the National Electrical Code, ANSI/NFPA 70.

The reference “Common bonding of other grounded services” is referring to: water service, gas piping, underground conduits, underground-liquefied petroleum gas piping systems, sprinkler systems, fuel oil lines, tank and tank lines, and similar piping systems. The term “water piping/bonding bus” means either/or not both as shown in the below illustrations.

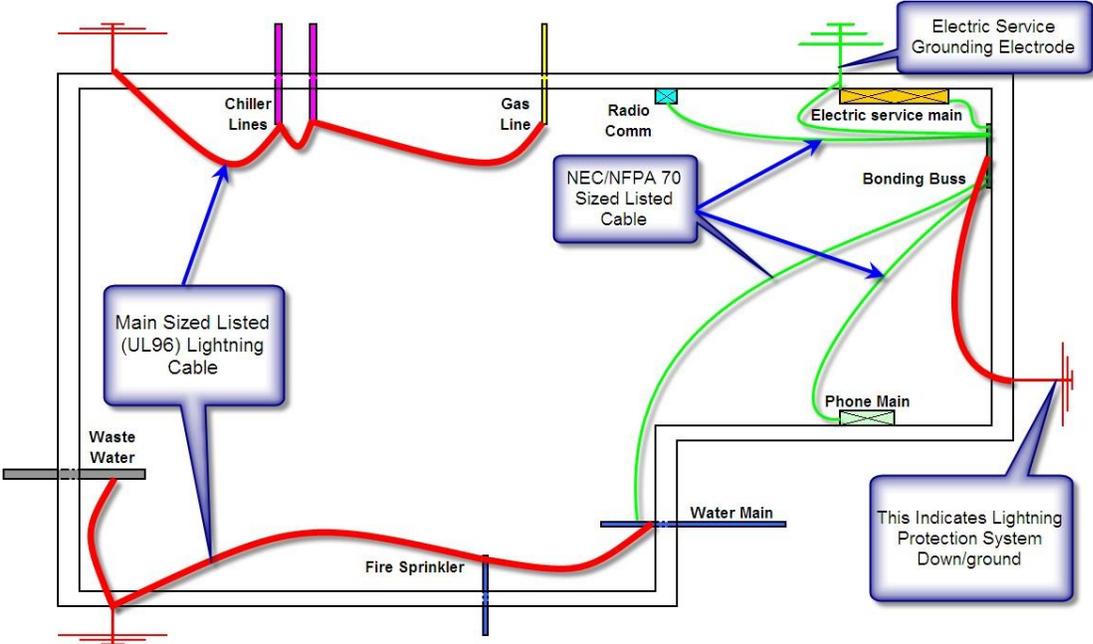
If potential grounded sources are not connected to the electrical bonding system, they must be connected as specified in 10.4.1.

The following illustrations are examples of the exception to 10.4.2 which could be utilized.

Bonding Example Utilizing Common Water Bonds



Bonding Example Utilizing Common Bonding Bus Bar



METAL BODIES SUBJECT TO DIRECT STRIKES

L11.8 If a continuity tester indicates the metal body is grounded a separate bonding connection shall be made. Exception: the structural steel may be used in lieu of down conductors (See also Par. 15.6 of UL 96A).

CONNECTORS AND FITTINGS

L12.1 Where conductors are routed in conduit the conduit must be fastened to the structure at intervals not exceeding the below table. Where conduit trade sizes larger than those listed in the below table are utilized, the conduit fastening spacing shall not exceed the specified spacing outlined in NFPA 70, National Electrical Code.

REQUIREMENTS FOR SECURING CONDUIT USED WITH LIGHTNING PROTECTION SYSTEM CONDUCTORS**

Conduit Type	Conduit Trade Size (in.)	Maximum Spacing of Securement (Based on 2020 NFPA 70 (NEC) Requirements)
Rigid Metal Conduit (RMC)	1/2 - 3/4	10 ft.
Intermediate Metal Conduit (IMC)	1	10 ft. without Threaded Couplings, 12 ft. with Threaded Couplings
	1 1/4 - 1 1/2	10 ft. without Threaded Couplings, 14 ft. with Threaded Couplings
Electrical Metallic Tubing (EMT)	All Sizes	10 ft.
Rigid Polyvinyl Chloride Conduit (PVC) Schedule 40 (+) & Schedule 80	1/2 - 1	3 ft.
	1 1/4 - 2	5 ft.
Reinforced Thermosetting Resin Conduit (RTRC)	1/2 - 1	3 ft.
	1 1/4 - 2	5 ft.
	Any	If the conduit is marked "Suitable for use at a support distance of ____ m (____ ft)" the conduit may be supported at no more than the specified maximum distance marked.

** The angle of bend and radius of bend shall comply with UL 96A, Paragraph 9.1.4.

(+) Schedule 40 is not preferred to be installed in locations where physical damage could occur.

Where conduit is used the 8 inch minimum bend radius must be maintained. Reference UL 651 for PVC conduit trade sizes and dimensions.

L12.3 The use of roofing membrane is not allowed as securement of LP system conductors. The system conductors must be secured with Listed connectors. After the conductor has been secured with Listed glue down fittings the roofing contractor may place roofing membrane over the fittings.

L12.13, L12.14 With respect to exothermic welding, determine through visual verification that the weld is solid.

SURGE PROTECTION

L13.1 For additional information, please refer to the Guide to Verifying Surge Protection Devices which is available on the Installer application log-in page @ <https://lps.ul.com>

L13.1, L13.2 The location of installed surge protection may be located in the structure being inspected or located in a nearby protected structure.

The electrical or electronic system conductors leaving the protected structure must not be more than 100 feet (30m) from the exterior wall of the protected structure to the exterior wall of the structure being inspected to be able to utilize the SPD for coverage.

The nearby protected structure must have a current MLC or be a structure being inspected at the same time of the inspection on the structure without SPD's installed to substantiate the use of the SPD in a different

structure. There is no limit to the number of unprotected structures that may utilize the SPD in the nearby protected structure for compliance as long as each structure without SPD's is no more than 100 feet (30m) from the nearby protected structure. If there are electrical or electronic conductors entering the structure being inspected that are not originating from the nearby protected structure (therefore not covered by the installed SPD(s)) the SPD's on the conductors will need to comply with clauses 13.1-13.3 as applicable.

The UL inspection program for Master Label Certificate and Letters of Findings allow the omission of surge protective devices.

The UL Master Label certificate allows for surge omission of both the electrical and communications surge protection. This omission is offered to any published standard that is requested for the inspection. Disclaimers for the surge omission are included on the Master Label certificate when either (or both) electrical and communications surge protection indicating the following:

For electrical surge omission: "The electrical service entrance surge protection system was not inspected. Surge protection devices are an integral component of a complete lightning protection system and should be provided on all incoming and exiting electric power, data, and communication services."

For communications surge omission: "The communication surge protection system was not inspected. Surge protection devices are an integral component of a complete lightning protection system and should be provided on all incoming and exiting electric power, data, and communication services."

For both electrical and communications surge omission: "Surge protection was not inspected. Surge protection devices are an integral component of a complete lightning protection system and should be provided on all incoming and exiting electric power, data, and communication services."