

MASTER SPECIFICATION

Lightning Protection Systems

for

- EARLY STREAMER EMISSION AIR TERMINAL SYSTEMS
- FARADAY MULTI-POINT SYSTEMS

Schools
Churches
Hotels
Apartments
Offices
Factories
Hospitals
Storage Elevators
Warehouses
Mills
Hangars
Terminals
Residences
Farms
All Other Commercial
Industrial Type Buildings

Heary Bros. Lightning Protection, Co., Inc.

11291 Moore Road

Springville, New York 14141

Toll FREE: 1-800-421-6141 Telephone: 716-941-6141

FAX: 716-941-3828

GENERAL INFORMATION:

This booklet contains nine sets of detailed construction specifications for lightning protection systems for most types of buildings. These specifications meet or exceed all standard requirements and industry standards. The basic format used is that of the Construction Specifications Institute to help assure comprehensiveness and ease of use.

Following is an index and guide to the usage and application for these specifications. Keep in mind that they are for general construction only, and are not meant for use on such facilities as electrical distribution or switching stations or lines, or structures used for production, storage, or handling of explosives or highly flammable substances.

INDEX:

General Information, Index and Usage Guide.....	Page	2-3
Early Streamer Emission Air Terminal Systems.....	Page	4-6
Set 1 - Faraday Systems, copper, less than 75 ft. in height.....	Page	7-8
Set 2 - Faraday Systems, aluminum, less than 75 ft. in height.....	Page	9-10
Set 3 - Faraday Systems, copper, over 75 ft. in height.....	Page	11-12
Set 4 - Faraday Systems, aluminum, over 75 ft. in height.....	Page	13-14
Set 5 - Faraday Systems, copper, less than 75 ft. in height.....	Page	15-16
Set 6 - Faraday Systems, aluminum, less than 75 ft. in height.....	Page	17-18
Set 7 - Faraday Systems, copper, over 75 ft. in height.....	Page	19-20
Set 8 - Faraday Systems, aluminum, over 75 ft. in height.....	Page	21-22

USAGE GUIDE:

The nine sets of specifications included in this booklet are intended to be used on a specific type and size structure.

Three determining factors for selecting a specification for a given building are:

- 1) Frame type
 - a) Electrically continuous steel frame
 - b) Non-conductive
 1. Concrete
 2. Masonry
 3. Wood frame
- 2) Building Height
 - a) Class I (under 75' above grade)
 - b) Class II (over 75' above grade)
- 3) Material Type
 - a) Aluminum components
 - b) Copper components

Early Streamer Emission Air Terminal

Listing of Components and Certification of Installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the installation of Heary Bros. Lightning Protection and Lightning Preventor of America's ESE lightning protection systems for compliance with Manufacturer's Installation Standard HBP-21.

The Early Streamer Emission (ESE) air terminal provides the design engineer with an air terminal free of space charges. The ESE is capable of creating ionization around the point of the air terminal. The ESE concentrates ion electric fields to release free ion electrons on the approach of a lightning down leader.

The ESE air terminal is a versatile lightning protection system and can be used on any structure or facility when properly installed in accordance with the Manufacturer's Installation Standard HBP-21.

This Manufacturer's standard is based upon Heary Bros.' 30 years experience in designing lightning protection systems. Because of the lack of a complete understanding of the interaction between lightning and ground based objects and the lightning attachment process, the number and placement of air terminals set forth in this Manufacturer's standard is based solely on Heary Bros.' Experience and its air terminals and the configuration of those terminals have not been scientifically proven or guaranteed to have a measurable zone of protection.

SETS 1 - 2

These sets are all for concrete/ masonry or wood frame structures with a total height less than 75' above grade. The final choice of specification in this group is based on component type. Set 1 allows for the use of only copper equipment for the entire system. Set 2 makes an aluminum roof system mandatory where this situation is desired or necessary due to roof construction. Copper is still retained for the downlead and grounding portions of the system.

SETS 3 - 4

These specifications are again for concrete/ masonry or wood frame structures but in this case all or part of the building exceeds 75' above grade. Again the selection of a specification is based on component type required. The component choices are the same as those outlined above for set 1.

SETS 5 - 8

These four sets provide complete coverage for all continuous steel frame buildings. The basis for choice of specification on these type buildings are again components, either copper or aluminum, and building height. Sets 5 and 7 are strictly for an all copper system, and Sets 6 and 8 call for only aluminum to be used in the roof system with a copper ground system. The choice again depends on preference and structural considerations.

SELECTION CHART

Heary Bros. Lightning Protection, Co., Inc.

Master Specification Set 1

Combine Proper Combination of I, II and III in Same Horizontal Row

IV is Proper Specification

I. Frame Type	II. Max. Bldg. Height	III. Material Required	IV. Use Spec Set
Conductive (continuous steel frame) versus Non-conductive (wood or masonry frame)	All or Part of Structure 75' or more above finished grade versus below 75'	Copper or Aluminum Lightning Protection System - Components as desired/required	Select proper Spec From this column Based on Col. I, II or III
Non-conductive	Below	Copper only	Use Set 1 or ESE
Non-conductive	Below	Aluminum on Roof with Copper Ground	Use Set 2 or ESE
Non-conductive	Above	Copper only	Use Set 3 or ESE
Non-conductive	Above	Aluminum on Roof with Copper Ground	Use Set 4 or ESE
Conductive	Below	Copper only	Use Set 5 or ESE
Conductive	Below	Aluminum on Roof with Copper Ground	Use Set 6 or ESE
Conductive	Above	Copper only	Use Set 7 or ESE
Conductive	Above	Aluminum on Roof with Copper Ground	Use Set 8 or ESE

NOTES AND COMMENTS

**Contact Heary Bros. Engineering Department for additional information or for answers to any lightning protection questions.
1-800-421-6141**

EARLY STREAMER EMISSION AIR TERMINAL SYSTEM

SECTION 16601 LIGHTNING PROTECTION SYSTEMS

PART 1 GENERAL

Listing of components, inspection and certification of installations: Applied Research Laboratories, Inc., an independent, nationally recognized testing laboratory, shall list the components, inspect and certify the installation of Heary Bros. Lightning Protection and Lightning Preventor of America's ESE lightning protection systems for compliance with Manufacturer's Installation Standard HBP-21.

1.01 SUMMARY

- A. Provide all labor, components, equipment, and services to perform all operations required for the complete installation and related work as specified herein.
- B. Any such work in any other section of these specifications that is not specifically described therein shall comply with the requirements of this section.
- C. The following items of work are specifically included in, but not necessarily limited to, the work of this section without limiting the generality implied by these specifications:
 - 1. ESE lightning protection air terminal
 - 2. Mast, complete with base and supports
 - 3. Down conductors
 - 4. Grounds
 - 5. Transient Voltage Surge Suppression

1.02 SUBMITTALS

- A. The ESE installer shall provide ten (10) complete sets of shop drawings for review, showing location of ESE air terminal, mast conductors, installation procedures and details.
- B. Detailed manufacturer's data sheets on all components, accessories and miscellaneous equipment shall also be submitted.

1.03 DESCRIPTION OF SYSTEM

- A. The ESE installer shall provide a complete installation of equipment to comprise a complete system in accordance with Manufacturer's Installation Standard HBP-21.
- B. The ESE installer shall be responsible for all components and labor to accomplish this result.
- C. The system, including the ESE air terminal, conductors, mast and complementary parts, shall be installed so that completed work is unobtrusive and does not detract from the building appearance.

1.04 CODES, REGULATIONS, PERMITS

- A. The completed system shall comply with the ESE manufacturer's standard, equipment supplier drawings and specification requirements for installation of ESE lightning protection systems.
- B. The installer, at his expense, shall accomplish any corrections required by the inspection.
- C. Noncompliance shall be reported to the equipment supplier for consideration.

1.05 STANDARDS OF QUALITY

- A. The ESE system equipment supplier, contractor, and installer shall install the ESE system in compliance with the Manufacturer's Installation Standard HBP-21.
- B. The ESE system and manufacturer's guarantees and warranties shall be submitted to the owner upon completion of the ESE system installation.
- C.

1.06 SERVICE AND INSPECTION

- A. Installation of equipment shall be reviewed by the manufacturer, and shall be in accordance with the manufacturer's requirements. The installation shall be inspected by Applied Research Laboratories, Inc. for compliance with Manufacturer's Installation Standard HBP-21.
- B. The lightning protection installing contractor shall provide a videotape of the installation, including but not limited to; mast mounting, bonding connections (waterline & structural steel), down conductors, ground rods/grids and all buried, concealed or inaccessible connections and components.
- C. This information shall be forwarded to the ESE manufacturer for evaluation, certification, archiving and documentation.
- D. The Manufacturer shall forward the videotape to Applied Research Laboratories, Inc. for inspection and certification.
- E. The ground resistance of the completed system shall be measured using IEEE "Fall of Potential Method" in the presence of the Architect/Engineer and shall be forwarded to the ESE manufacturer.

EARLY STREAMER EMISSION AIR TERMINAL SYSTEM

- F. Ground resistance shall be ten (10) ohms or less.
- G. Listing of components and certification of installation: Applied Research Laboratories; shall list the components, inspect and certify the installation of Heary Bros. Lightning Protection and Lightning Preventor of America's ESE lightning protections systems for compliance with Manufacturer's Installation Standard HBP-21.

PART 2 PRODUCTS

2.01 ESE AIR TERMINAL

- A. The complete assembly shall consist of a 5/8" air terminal, which is HD 29 CU, and heavy chrome plated 24 CH. Lock nut and washer shall be chrome plated copper. Support structure shall be chrome plated soft copper. Sphere shall be threaded to the air terminal.
- B. The base of the ESE air terminal shall be threaded for interconnection to top of mast.

2.02 CONDUCTORS

- A. Copper conductors shall be 28 strands of 14-gauge wire rope lay, with a net weight of 375 pounds per 1,000 feet (60mm²), minimum.
- B. The structural steel may be utilized as the main conductor provided the steel is electrically continuous or is made so via other means.
 - 1. Every other column or an average of 60'-0" (18m) intervals shall be bonded and connected to the ground system.
- C. All conductors shall be secured every 3'-0" (900mm) maximum.
- D. Fasteners and clips utilized shall be of equal corrosion resistance as the components being secured.
- E. Bonding of all conductive material within 6'-0" (1800mm) of the conductor shall be accomplished via secondary conductor no smaller than #6 (14mm²) copper.
- F. Bare copper components shall not be installed on dissimilar metals. Corrosion resistant copper equipment shall be utilized where these conditions exist.
- G. Corrosion resistant copper conductors and fittings shall be utilized where corrosive atmospheres are present.
- H. Conductors shall be installed so that a conductor shall always have a horizontal or downward path, free of "U" and "V" pockets, with the exception that an 8" (203mm) maximum rise, or a rise of 3" (80mm) maximum for every 12" (300mm) of conductor length shall be permitted in a main conductor run.
- I. Each ESE terminal shall have two (2) paths to ground from the base plate of the mast, with the exception of an elevated mast that may have a single conductor run for a maximum of 16'-0" (4880mm) before two (2) down conductors shall be initiated.
- J. The electrical contractor shall furnish and install all necessary PVC conduit for concealed down conductors.
- K. No bend of a conductor shall be less than 90° and shall not have a radius of bend of less than 8" (203mm). Exceptions are through roof and wall assemblies and "T" connections.

2.03 MAST

- A. Aluminum or stainless steel mast with threaded connection for the ESE air terminal and bonding plate for cable connection. Wind and safety factors shall be documented for the geographic area of installation, to determine the size and structure of mast.
- B. Base support, depending upon application, flat mounting base, side mounting base and/or structural support, and/or flagpole may be utilized.

2.04 GROUNDING SYSTEM

- A. Ground rods shall be copperbond 3/4" x 10'-0", minimum.
- B. One set of tripod grounds shall be installed for each down conductor. Refer to paragraph 2.02 B, for structural steel used as down conductors.
- C. Ground plates of high conductivity copper sheet, 20 gauge minimum, 18 in. sq., may be used in lieu of, or in combination with ground rods, to achieve the ten (10) ohm resistance grounding system requirement.
- D. The cable attachments to the ground rods must be accomplished via mechanical clamp. Cable attachments to ground plates shall be via copper bond plates of eight 8in² (5161mm²) of contact area.
- E. A ground loop may be substituted for the ground rods or ground plates. The ground loop must be of a main size conductor and shall comply with the ten (10) Ohm resistance requirement of the grounding system.
- F. Ground rods, ground plates, and ground loop conductors shall be installed a minimum of 1ft. (300mm) below grade and a minimum of 2ft. (600mm) away from the foundation.
- G. All grounding locations shall be as evenly spaced around the building perimeter as possible.
- H. A minimum of one (1) inspection well, rated for the traffic of the installation area, shall be installed for each down conductor or two (2) minimum per ground loop.
- I. Bonding of grounded systems shall be via main size conductors. The bonding shall be accomplished to achieve equal potential of all grounds.

EARLY STREAMER EMISSION AIR TERMINAL SYSTEM

2.05 CONNECTORS, FITTINGS, FASTENERS, AND HARDWARE

- A. Provide all connectors, fittings, fasteners, hardware, clamps, guards, lugs, etc., as required to connect, and install all parts of the system.
- B. All equipment shall be fabricated from copper and/or bronze components

2.06 SURGE SUPPRESSION

- A. Provide surge protection on the electrical, telephone, and antenna and TV lead wires.
- B. The surge suppresser for the main electrical panel shall be industrial grade, with replaceable modules, fused, indicator lights.
- C. The electrical surge suppression equipment shall be installed at the main entrance of the electrical system with a disconnecting mechanism.
- D. The surge suppresser shall have the capability of being disconnected without shutting down the electrical system.
- E. Telephone surge suppression shall be to the standards of the telephone system carrier.
- F. The suppresser shall be industrial grade with replaceable modules, and a reaction time of less than one (1) nanosecond.
- G. This surge equipment shall be installed at the main entrance of the telephone system.
- H. Antenna and TV lead wire suppressers shall be industrial grade suitable for the conductor, coax or hard wire. The suppresser shall have a reaction time of less than one (1) nanosecond and shall be installed as close to the antenna or TV camera as possible.

PART 3 EXECUTION

3.01 INSTALLATION-GENERAL

- A. Installation shall be accomplished in a professional manner by an installer of verifiable ESE system installations.
- B. All work installed within the building shall be concealed.
- C. All work installed in accessible locations shall be properly guarded and protected.
- D. All components shall be installed in a manner to prevent electrolytic action under presence of moisture.
- E. All roof, wall or other building penetrations shall be made in a manner to prevent the ingress of water or moisture.
- F. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- G. PVC conduit shall be provided by the electrical contractor.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 MANUFACTURER

- A. Heary Bros. Lightning Protection Co., Inc. Tel.: 800-421-6141 FAX: 716-941-3828
- B. Lightning Preventor of America Tel.: 800-421-6141 FAX: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAMES AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM UNDER 75 FT. (COPPER)

Set 1 - Copper, Utilizing Down Conductors

SECTION 16610: LIGHTNING PROTECTION SYSTEM

PART I GENERAL

1.1 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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.
- C. The equipment manufacturer shall be an approved manufacturer. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.3 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.02 Equipment

- A. All components shall be copper or bronze and of the size, weight and construction to suit the application where used in accordance with requirements for Class I structures, and in accordance with manufacturer recommendations.
- B. **Conductors** shall be copper, 29 strands 17-gauge minimum, Heary Bros. Cat. No. CCHB-29-17.
- C. **Air terminals** shall be solid round copper bar 3/8" x 12" minimum. Air terminals shall project 10" minimum above the object to be protected. Locate and space according to requirements.
- D. **Air terminal bases** shall be copper or bronze with bolt pressure cable connectors and shall be securely mounted with stainless steel screws or bolts.
 - 1. 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.
- E. **Ground rods** shall be 5/8" x 10'-0" minimum, Heary Bros. Cat. No. CGHB106GR. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.
- F. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. CFHB66, 72, 64, etc.
- G. **Bonding devices**, cable splicers and miscellaneous connectors shall be of copper or bronze with bolt pressure cable connectors.

FARADAY MULTI-POINT SYSTEM UNDER 75 FT. (COPPER)

- H. Bonding devices, cable splicers and miscellaneous connectors shall be of aluminum with bolt pressure cable connectors.
- I. Equipment on stacks and chimneys shall be protected from corrosion and sized in accordance with requirements.
- J. All miscellaneous bolts, nuts and screws shall be stainless steel.
- K. An approved bimetal transition fitting shall be used at the roof level to change from aluminum roof conductor to copper down conductor.

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The system shall consist of a complete cable network on the roof involving all air terminals, splices, and bonds with cable downleads routed concealed either directly in the building construction or in conduit to ground.
- D. Downlead cables shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- E. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- F. The electrical contractor shall furnish and install all necessary PVC conduit for concealed down conductors.
- G. Copper equipment shall not be connected to aluminum surfaces except by means of a bimetal transition fitting. Lead coating is not an acceptable bimetal transition.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the electrical contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM UNDER 75 FT (ALUMINUM)

Set 2 - Aluminum, Utilizing Down Conductors

SECTION 16610 LIGHTNING PROTECTION SYSTEM

PART I GENERAL

1.01 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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.
- C. The equipment manufacturer shall be an approved manufacturer. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.03 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.02 Equipment

- A. All components shall be copper or aluminum as described below, and of the size, weight, and construction to suit the application where used in accordance with requirements for Class I structures, and in accordance with manufacturer recommendations.
- B. **Roof conductors** shall be aluminum of 24 strands 14-gauge minimum, Heary Bros. Cat. No. ACHB24-14.
- C. **Down conductors** from roof to ground shall be copper, 29 strands, 17-gauge minimum, Heary Bros. Cat. No. CCHB29-17.
- D. **Air terminals** shall be solid round aluminum bar 1/2" x 12" minimum. Air terminals shall project 10" minimum above the object to be protected. Locate and space according to requirements
- E. **Air terminal bases** shall be aluminum with bolt pressure cable connections and shall be securely mounted with stainless steel screws or bolts.
 - I. 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 5/8" x 10'-0" minimum, Heary Bros. Cat. No. CGHB106GR. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.
- G. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. AFHB66, 72, etc.

FARADAY MULTI-POINT SYSTEM UNDER 75 FT (ALUMINUM)

- H. **Bonding devices**, cable splicers and miscellaneous connectors shall be of aluminum with bolt pressure cable connectors.
- I. Equipment on stacks and chimneys shall be protected from corrosion and sized in accordance with requirements.
- J. All miscellaneous bolts, nuts and screws shall be stainless steel.
- K. An approved bimetal transition fitting shall be used at the roof level to change from aluminum roof conductor to copper down conductor.

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The system shall consist of a complete cable network on the roof involving all air terminals, splices, and bonds with cable downleads routed concealed either directly in the building construction or in conduit to ground.
- D. Downlead cables shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- E. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- F. The electrical contractor shall furnish and install all necessary PVC conduit for concealed down conductors.
- G. The limitations on areas of usage for aluminum cables and for copper and aluminum components together as outlined shall be observed using bimetallic connections.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the Electrical Contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM OVER 75 FT (COPPER)

Set 3 - Copper, Utilizing Down Conductors

SECTION 16610:

LIGHTNING PROTECTION SYSTEM

PART I GENERAL

1.01 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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.
- C. The equipment manufacturer shall be an approved manufacturer. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.03 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.02 Equipment

- A. All components shall be copper or bronze and of the size, weight, and construction to suit the application where used in accordance with requirements for Class II structures, and in accordance with manufacturer recommendations.
- B. Class I equipment may be used on roof areas not exceeding 75' above grade. Requirements for bases, splicers and other fittings shall remain the same.
- C. **Conductors** shall be of 28 strands 14-gauge minimum diameter. Heary Bros. Cat. No. CCHB-28-14.
- D. **Air terminals** shall be solid round copper bar 1/2" x 12" minimum, Heary Bros. Cat. No. CAHB302. Air terminals shall project 10" minimum above the object to be protected. Locate and space according to requirements.
- E. **Air terminal bases** shall be copper or bronze with bolt pressure cable connections and shall be securely mounted with stainless steel screws or bolts.
 - I. 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 5/8" x10'-0" minimum, Heary Bros. Cat. No. CGHB106GR. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.

FARADAY MULTI-POINT SYSTEM OVER 75 FT (COPPER)

- G. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. CFHB66, 72, or 64, etc.
- H. **Bonding devices**, cable splicers and miscellaneous connectors shall be of copper or bronze with bolt pressure cable connectors.
- I. Equipment on stacks and chimneys shall be protected from corrosion in accordance with requirements.
- J. All miscellaneous bolts, nuts and screws shall be stainless steel.

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The system shall consist of a complete cable network on the roof including all air terminals, splicers and bonds with cable downleads routed concealed either directly in the building construction or in conduit to ground.
- D. Downlead cables shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- E. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- F. The electrical contractor shall furnish and install all necessary PVC conduit for concealed down conductors.
- G. Copper equipment shall not be connected to aluminum surfaces except by means of a bimetal transition fitting, Heary Bros. Cat. No. MNHB-93. Lead coating is not to be accepted as a bimetal transition.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the Electrical Contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM OVER 75 FT (ALUMINUM)

Set 4 - Aluminum, Utilizing Down Conductors

SECTION 16610: LIGHTNING PROTECTION SYSTEM

PART I GENERAL

1.1 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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.
- C. The equipment manufacturer shall be an approved manufacturer. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.03 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.02 Equipment

- A. All components shall be copper or aluminum as described below and of the size, weight, and construction to suit the application where used in accordance with requirements for Class II structures, and in accordance with manufacturer recommendations.
- B. Class I equipment may be used on roof areas not exceeding 75' above grade. Requirements for bases, splicers and other fittings shall remain the same.
- C. **Roof conductors** shall be aluminum, 37 strands 13-gauge minimum, Heary Bros. Cat. No. ACHB37-13.
- D. **Down conductors** from roof to ground shall be copper, 28 strands 14-gauge minimum, Heary Bros. Cat No. CCHB28-14.
- E. **Air terminals** shall be solid round aluminum bar, 5/8" x 12" minimum. Air terminals shall project 10" minimum above the object to be protected. Locate and space according to requirements.
- F. **Air terminal bases** shall be aluminum with bolt pressure cable connections and shall be securely mounted with stainless steel screws or bolts.
 - I. 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.
- G. **Ground rods** shall be 5/8" x 10'-0" minimum, Heary Bros. Cat. No. CGHB106. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.

FARADAY MULTI-POINT SYSTEM OVER 75 FT (ALUMINUM)

- H. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. AFHB66, 72, 64, etc.
- I. **Bonding devices**, cable splicers and miscellaneous connectors shall be of aluminum with bolt pressure cable connector.
- J. Equipment on stacks and chimneys shall be protected from corrosion in accordance with requirements.
- K. All miscellaneous bolts, nuts and screws shall be stainless steel.
- L. An approved bimetal transition fitting, Cat. No. MNHB-93 shall be used at the roof level to change from aluminum roof conductor to copper down conductor.

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The system shall consist of a complete cable network on the roof including all air terminals, splices, and bonds with cable downloads routed concealed either directly in the building construction or in conduit to ground.
- D. The copper download cables shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- E. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- F. The electrical contractor shall furnish and install all necessary PVC conduit for concealed down conductors.
- G. An approved bimetal transition fitting shall be used at the roof level to change from aluminum roof conductor to copper down conductor.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the electrical contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM UNDER 75 FT (COPPER)

Set 5 - Copper, Utilizing Structural Steel

SECTION 16610: LIGHTNING PROTECTION SYSTEM

PART I GENERAL

1.1 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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.
- C. The equipment manufacturer shall be an approved manufacturer. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.03 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.02 Equipment

- A. All components shall be copper or bronze, and of the size, weight, and construction for use on steel framed buildings in accordance with requirements for Class I structures, and in accordance with manufacturer recommendations.
- B. **Main conductors** shall be copper of 29 strands 17-gauge minimum, Heary Bros. Cat. No. CCHB29-17.
- C. **Air terminals** shall be solid round copper bar 3/8" x 12" minimum, Heary Bros. Cat. No. CAHB308. Air terminals shall project 10" minimum above the object to be protected. Locate and space according to requirements.
- D. **Air terminal bases** shall be of copper with bolt pressure cable connections and shall be securely fastened with stainless steel screws or bolts.
 - 1. 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.
- E. **Ground rods** shall be 5/8" x 10'-0" minimum, Heary Bros. Cat. No. CGHB106GR. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.
- F. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. CFHB66, 72, 64C, etc.
- G. **Bonding devices**, cable splicers, and miscellaneous connectors shall be of copper or bronze with bolt pressure cable connectors.

FARADAY MULTI-POINT SYSTEM UNDER 75 FT (COPPER)

- H. Equipment on stacks and chimneys shall be protected from corrosion in accordance with requirements.
- I. All miscellaneous bolts, nuts and screws shall be stainless steel.
- J. Connections to structural steel shall be made with bonding plates of copper or bronze with bolt pressure cable connectors.

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The electrically continuous steel frame of the building shall serve as the down conductors for the lightning protection system. The number, size, type and location of grounds and connections to steel at roof and grade level shall be as required.
- D. A complete cable system with related air terminals, splices, and bonds, etc., shall be used on the roof.
- E. Downlead cables to steel frame from the cable roof system shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- F. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- G. The electrical contractor shall furnish and install all necessary PVC conduit.
- H. Copper equipment shall not be connected to aluminum surfaces except by means of a bimetal transition fitting. Lead coating is not to be accepted as a bimetal transition.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the electrical contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM UNDER 75 FT (ALUMINUM)

Set 6 - Aluminum, Utilizing Structural Steel

SECTION 16610: LIGHTNING PROTECTION SYSTEM/I

PART I GENERAL

1.1 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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 manufacturer shall be an approved manufacturer.
- C. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.03 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.02 Equipment

- A. All components shall be copper or aluminum as described below and of the size, weight, and construction for use on steel framed buildings in accordance with requirements for Class I structures, and in accordance with manufacturer recommendations.
- B. **Roof conductors** shall be aluminum, 24 strands 14-gauge minimum, Heary Bros. Cat. No. ACHB24-14.
- C. **Down conductors** from base of steel columns to ground shall be copper, 24 strands 16-gauge minimum, Heary Bros. Cat. No. CCHB24-16.
- D. **Air terminals** shall be solid round aluminum bar 1/2" x 12", Cat. No. AAHB302. Air terminals shall project 10" minimum above the object to be protected. Locate and space according to requirements.
- E. **Air terminal bases** shall be aluminum with bolt pressure cable connections and shall be securely mounted with stainless steel screws or bolts.
 - 1. 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 5/8" x 10' -0" minimum, Heary Bros. Cat. No. CGHB106GR. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.
- G. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. AFHB66, 72, 64A, etc.
- H. **Bonding devices**, cable splicers and miscellaneous connectors on the roof shall be of aluminum with bolt pressure cable connectors.

FARADAY MULTI-POINT SYSTEM UNDER 75 FT (ALUMINUM)

- I. Equipment on stacks and chimneys shall be protected from corrosion in accordance with requirements.
- J. All miscellaneous bolts, nuts and screws shall be stainless steel.
- K. Connections to structural steel shall be made with bonding plates of copper or aluminum with bolt pressure cable clamps.

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The electrically continuous steel frame of the building shall serve as the down conductors for the lightning protection system. The number, size, type and location of grounds and connections to steel at roof and grade level shall be as required.
- D. A complete cable system with related air terminals, splices and bonds, etc., shall be used on the roof.
- E. Aluminum downlead cables to steel frame from the cable roof system shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- F. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- G. The electrical contractor shall furnish and install all necessary PVC conduit for concealed down conductors.
- H. The limitations on areas of usage for aluminum cables and for copper and aluminum components together as outlined shall be observed using bimetallic connections.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the electrical contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM OVER 75 FT (COPPER)

Set 7 - Copper, Utilizing Structural Steel

SECTION 16610:

LIGHTNING PROTECTION SYSTEM

PART I GENERAL

1.01 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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.
- C. The equipment manufacturer shall be an approved manufacturer. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.03 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.2 Equipment

- A. All components shall be copper or bronze and of the size, weight, and construction for use on steel framed buildings in accordance with requirements for Class II structures, and in accordance with manufacturer recommendations.
- B. **Main conductors** shall be copper, 28 strands 14-gauge minimum, Heary Bros. Cat No CCHB28-14.
- C. **Air terminals** shall be solid round copper bar 1/2" x 12", Heary Bros. Cat. No. HB302C. Air terminals shall project 10" minimum above the object to be protected. Locate and space according to requirements.
- D. **Air terminal bases** shall be of copper or bronze with bolt pressure cable connectors and shall be securely mounted with stainless steel screws or bolts.
 - 1. 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.
- E. **Ground rods** shall be 5/8" x 10'-0" minimum, Heary Bros. Cat. No. CGHB106GR. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.
- F. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. CGHB66, 72, 64C, etc.
- G. **Bonding devices**, cable splicers and miscellaneous connectors shall be of copper or bronze with bolt pressure cable connectors.
- H. Equipment on stacks and chimneys shall be protected from corrosion in accordance with requirements.
- I. All miscellaneous bolts, nuts and screws shall be stainless steel.
- J. Connections to structural steel shall be made with bonding plates of copper or bronze with bolt tension cable clamps.

FARADAY MULTI-POINT SYSTEM OVER 75 FT (COPPER)

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The electrically continuous steel frame of the building shall serve as the down conductors for the lightning protection system.
- D. The number, size, type and location of grounds and connections to steel at roof and grade level shall be as required.
- E. The roof system shall consist of a complete cable network including air terminals, splices and bonds, etc.
- F. Downlead cables to steel, from the cable roof system, shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- G. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- H. The electrical contractor shall furnish and install all necessary PVC conduit.
- I. Copper equipment shall not be connected to aluminum surfaces except by means of bimetal transition fitting. Lead coating is not to be accepted as a bimetal transition.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the electrical contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION

FARADAY MULTI-POINT SYSTEM OVER 75 FT (ALUMINUM)

Set 8 - Aluminum, Utilizing Structural Steel

SECTION 16610:

LIGHTNING PROTECTION SYSTEM

PART I GENERAL

1.01 Summary

- A. The work covered by this section of the specifications consists of furnishing all labor, components 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 and the applicable contract drawings.
- B. If any departure from the contract drawings or submittal drawings covered below 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.

1.02 Quality Assurance

- A. Listing of components and inspection and certification of installations: Applied Research Laboratories, Inc. shall list the components and shall inspect and certify the multipoint lightning protection systems for compliance with NFPA 780 Standard.
- 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.
- C. The equipment manufacturer shall be an approved manufacturer. All components specified for this work shall be manufactured by Heary Bros. Lightning Protection Co., Inc., Springville, New York, or approved equal. For approval of a manufacturer other than specified, proposed component data and installation drawings must be submitted for review not less than 10 days prior to bid.

1.03 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. Samples and pertinent catalog data shall be submitted to the architect for approval upon request.

PART 2 PRODUCTS

2.01 Standard

- A. All equipment shall be new, the product of a single manufacturer as outlined above, and of a design and construction to suit the application where it is used in accordance with accepted industry standards.

2.02 Equipment

- A. All components shall be copper or aluminum as described below, and of the size, weight, and construction for use on steel framed buildings in accordance with requirements for Class II structures, and in accordance with manufacturer recommendations.
- B. **Roof conductors** shall be aluminum, 37 strands 13-gauge minimum, Heary Bros. Cat. No. ACHB37-13.
- C. **Down conductors** from base of steel columns to ground shall be copper, 28 strands 14-gauge minimum, Heary Bros. Cat. No. CCHB28-14.
- D. **Air terminals** shall be solid round aluminum bar 5/8" x 12". Air terminals shall project 10" minimum above the object to be protected. Locate and secure according to requirements.
- E. **Air terminal bases** shall be aluminum with bolt pressure cable connectors and shall be securely mounted with stainless steel screws or bolts.
 - 1. 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 5/8" x 10'-0" minimum, Heary Bros. Cat. No. CGHB106GR. They shall be connected to the system with a two-bolt copper clamp having a minimum length of 1-1/2" and employing stainless steel cap screws.
- G. **Cable fasteners** shall be substantial in construction, electrolytically compatible with the conductor and mounting surface and shall be spaced according to requirements. Heary Bros. Cat. No. AFHB66, 72, 64, etc.
- H. **Bonding devices**, cable splicers and miscellaneous connectors on the roof shall be of aluminum with bolt pressure cable connectors.

FARADAY MULTI-POINT SYSTEM OVER 75 FT (ALUMINUM)

- I. Equipment on stacks and chimneys shall be protected from corrosion in accordance with requirements.
- J. All miscellaneous bolts, nuts and screws shall be stainless steel.
- K. Connections to structural steel shall be made with bonding plates of copper or aluminum with bolt pressure cable clamps.

PART 3 EXECUTION

3.01 Installation

- A. The installation shall be accomplished by an experienced installer. The installer shall work under the direct supervision of a manufacturer as listed above or a qualified distributor of such manufacturer's products.
- B. All equipment shall be installed in a neat workmanlike manner in the most inconspicuous manner possible.
- C. The electrically continuous steel frame of the building shall serve as the down conductors for the lightning protection system.
- D. The quantity, size, type and location of grounds and connections to steel at roof and grade level shall be as required.
- E. A complete cable system with related air terminals, splices and bonds, etc., shall be used on the roof.
- F. Aluminum downlead cables to steel from the cable roof system shall not be brought directly through the roof. Thru-roof connectors with solid rods or conduit through pitch pockets shall be utilized for this purpose.
- G. Roof penetrations, flashings/pitch pans shall be furnished and installed by the roofing contractor.
- H. The electrical contractor shall furnish and install all necessary PVC conduit.
- I. The limitations on areas of usage for aluminum cables and for copper and aluminum components together as outlined shall be observed using bimetallic connections.

3.02 Coordination

- A. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other building ground systems, including both telephone and electrical.
- C. Proper arresters shall be installed on the power and telephone service by either the utility or the electrical contractor as applicable.

3.03 Completion

- A. The lightning protection installer shall secure and deliver the as-built shop drawings to the architect for the owner upon completion of the installation.

PART 4 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

4.01 NAMES AND PHONE NUMBERS

- A. Heary Bros. Lightning Protection Co., Inc.
11291 Moore Road
Springville, NY 14141
Tel: 800-421-6141 or 716-941-6141
Fax: 716-941-3828

PART 5 INSPECTION AND LISTING LABORATORY

5.01 NAME AND PHONE NUMBERS

- A. Applied Research Laboratories, Inc.
5371 N.W. 161st Street
Miami, FL 33014
Tel: 305-624-4800
Fax: 305-624-3652

END OF SECTION