# REQUEST FOR QUOTATION

**Vendor ID, Name, Address (insert here):**

**RFQ Number / Bid Due Date**
6000000073 / 10/21/2020
Bids must be received no later than 11:00:00 AM on the above Bid Due Date

**Deliver Goods/Services To:**
Port Newark - Eliz Marine Terminal
260 Kellogg Street
PORT NEWARK NJ 07114
USA

**Port Authority Buyer:**
John Santiago / 212-435-4613 / john.santiago@panynj.gov

| Quantity | Description | Unit Price | | Total |
|---|---|---|---|---|
| | AIRFIELD LIGHTING CABLE, 1/C #8 AWG, 5KV, ONE ITEM JACKETED BLACK AND ONE JACKETED YELLOW, TO NEWARK LIBERTY INTERNATIONAL AIRPORT.<br><br>ATTACHED PORT AUTHORITY SPECIFICATIONS DIVISION 26 SECTIONS 260000 AND 261015 SHALL APPLY.<br><br>THE PORT AUTHORITY INTENDS TO MAKE AN AWARD AS SOON AS POSSIBLE TO MEET THE CRITICAL NEEDS OF THE INTENDED PROJECT. AUTHORITY INSTALLATION SCHEDULE IS 1ST QUARTER 2021. VENDOR IS EXPECTED TO MEET THE FOLLOWING DELIVERABLES UNDER THIS ORDER:<br><br>- PARTIAL DELIVERY OF 25% OF EACH ITEM'S TOTAL ORDER NOT LATER THAN MID-FEBRUARY 2021<br>- BALANCE OF THE ORDER TO BE DELIVERED NOT LATER THAN MID-APRIL 2021<br>- EARLIER DELIVERIES ACCEPTED<br>- BIDDERS SHALL INDICATE LEAD TIMES FOR BOTH THE PARTIAL AND THE BALANCE DELIVERIES FOR EACH ITEM<br>- PRICES QUOTED ARE FINAL AND MUST ACCOUNT FOR PARTIAL DELIVERIES.<br><br>BIDDERS SHALL SUBMIT WITH THEIR BIDS A SPECIFICATION SHEET, DRAWING AND ANY OTHER DOCUMENTATION ON THEIR PRODUCT TO | | | |
| | **PLEASE QUOTE FULLY DELIVERED PRICE** | **PAYMENT TERMS** | **Total Delivered Price** | |

**This Quotation is subject to the terms and conditions set forth back on the pages hereof. Bidder is advised to read these before.**

We have read the instructions and, if favored with an order, we agree to furnish the items enumerated herein at the prices and under the conditions indicated.

Signed _____
Firm Name _____
Telephone number_____Date_____
Fax Number_____
Federal Taxpayer ID _____

**Bidder Must Sign In Two Places**

NOTICE TO BIDDERS: Unless the following term of assurance that the above offer is irrevocable is signed, the offer submitted herein shall not be deemed to be complete.

The foregoing offer shall be irrevocable for 90 days after the date on which the Port Authority of New York and New Jersey opens this proposal.

Signed_____Date_____
Firm Name_____

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| | 6000000073 / 10/21/2020 |

| **Quantity** | **Description** | **Unit Price** | Total |
|---|---|---|---|
| | FACILITATE AN EVALUATION BY THE PORT AUTHORITY. BIDDERS SHALL QUOTE NOT MORE THAN TWO (2) DECIMAL PLACES TO THE RIGHT OF THE DECIMAL POINT. IN THE EVENT THAT THIS REQUIREMENT IS NOT FOLLOWED, THE PORT AUTHORITY WILL NOT CONSIDER ANY EXTENDED DECIMAL VALUES AND WILL DEFAULT TO THE TWO DECIMAL POINTS QUOTED. THE PORT AUTHORITY WILL NOT ROUND UP OR DOWN ANY VALUES. QUOTES IN 1000/MFT OR KFT ARE NOT ACCEPTABLE. BIDDERS ARE TO QUOTE PER LINEAR FOOT (LF or FT).<br><br>PRICE QUOTED SHALL BE FIRM AND FIXED. UNDER NO CIRCUMSTANCES WILL PRICES BE ADJUSTED AT ANY TIME UNDER THE PURCHASE ORDER.<br><br>PRICE SHALL BE FOB DELIVERED, AND DELIVERY MUST BE BY FLATBED TRUCKS. CABLE REELS MUST BE MARKED WITH THE PURCHASE ORDER NUMBER, REEL NUMBER, MANUFACTURER NAME, FEET PER REEL.<br>REELS SHALL BE NON-RETURNABLE WOOD AND SHALL NOT BE WOOD FLANGE OR CARDBOARD COVER. PULLING GRIPS ARE NOT REQUIRED. ANY DELIVERY DOCUMENTS MUST INCLUDE THE ABOVE DETAILS,<br>PLUS "EWR-154-903 PROJECT". | | |
| | **PLEASE QUOTE FULLY DELIVERED PRICE** | **PAYMENT TERMS** | **Total Delivered Price** |

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| | **RFQ Number / Bid Due Date**<br>6000000073 / 10/21/2020 |

| Quantity | Description | Unit Price | Total |
|---|---|---|---|
| | In addition to signing this RFQ form, please provide:<br><br>Print name: _____<br><br>Email address: _____ | | |

| | | | |
|---|---|---|---|
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|---|---|
| | 6000000073 / 10/21/2020 |

| **Quantity** | **Description** | **Unit Price** | Total |
|---|---|---|---|
| | BID SUBMISSION INSTRUCTIONS:<br><br>The Port Authority has temporarily ceased public bid openings and will allow for the electronic submission of bids.<br><br>Bidders are advised that their bids must be electronically submitted as a readable Adobe PDF or in the format as provided by the Port Authority. The Port Authority shall only accept bids in electronic format until 11:00 A.M. ET on the Bid Due Date.<br><br>Electronic Bids should be submitted via email only, and only to Bid Custodian at **bidrfpsubmittal@panynj.gov.** Each electronic Bid submission must include all required information. The Port Authority may request an original, signed paper submission at any time following the Bid Due Date.<br><br>Each email submission should include the Due Date, Bid #, and solicitation title. If requested by the Port Authority, the paper submission must be identical to the electronic submission that was submitted by the Bid Due Date. In the event of a discrepancy, the electronic submission shall take precedence.<br><br>THERE WILL BE NO PUBLIC BID OPENINGS AND HAND DELIVERIES WILL NOT BE ACCEPTED.<br><br>Bid results will be posted to the Port Authority's website as soon as they are available. Bidders should anticipate that some emails may take a period to be delivered, and as such, should send them as early as possible to ensure it is received no later than 11:00 A.M. ET in the designated Port Authority's designated email account. | | |
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| Quantity | Description | Unit Price | Total |
|---|---|---|---|
| | Bidders should note that there is a limit to the size of attachments that can be received by the Port Authority's designated email account. That limit is 100MB. Additionally, Bidders must check their files to ensure they have submitted complete documents, i.e. no missing pages.<br><br>Bidders' internal networks may have limits on the size of emails they can send. Therefore, it is incumbent upon the Bidder to determine ahead of time that the file(s) being submitted can both be transmitted by their servers and accepted by Port Authority servers. If the files are too big, the Port Authority will accept Bid in multiple emails, provided all parts which comprise a complete submission are received by the Bid Due Date and time and all emails should include the Bid # and title. Under this circumstance, Bidders should note in the description of the email that the Bid will be arriving in multiple parts and include in the subject line the total number of components and which component, of the total, the particular transmission represents. | | |
| 360,000 FT | CS0100013<br><br>CABLE, 1/C #8 AWG, 5KV, AIRFIELD LIGHTING CABLE, PRIMARY SERIES LIGHTINGCABLE FOR AIRFIELD LIGHTING CIRCUITS, SHALL BE NON-SHIELDED 5000 VOLTRATED, TYPE B, COATED COPPER, CLASS-C, 7 STRANDS HAVING EXTRUDED SEMI-CON THERMOSETTING COMPOUND OVER STRANDS,ETHYLENE-PROPYLENE-RUBBER-INSULATED (ICEA S-96-659/NEMA WC71) AND PVC JACKETED IN COLOR BLACK. THE CABLE SHALL COMPLY WITH FAA-AC 150/5345-7 (LATEST EDITION) AND SHALL BE APPROVED | $ | $ |
| | **PLEASE QUOTE FULLY DELIVERED PRICE** | **PAYMENT TERMS** / **Total Delivered Price** | |

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| Quantity | Description | Unit Price | Total |
|---|---|---|---|
| | UNDER FAA SPECIFICATION L-824B. SHALL BE COMPATIBLE WITH AMERACE 54SUPER D4-D4 KIT OR APPROVED EQUAL WITH A MINIMUM OUTSIDE CABLE DIAMETER OF 0.320 INCH AND A MAXIMUM OUTSIDE DIAMETER OF 0.430 INCH. CABLE SHALL BE SUPPLIED ON NON-RETURNABLE REELS, 5000LF OF NON-PARALLEL SINGLE CONDUCTOR CABLE PER REEL.<br>OVERRUN TOLERANCE PER REEL: 5.0%<br>UNDERRUN TOLERANCE PER REEL: 0.0%<br>PER PA SECTION 260000 AND 261015.<br>MANUFACTURERS: PRYSMIAN (DRAKA), OKONITE OR APPROVED EQUAL. BOTH CABLE ENDS SHALL BE ACCESSIBLE ON EACH REEL FOR TESTING PURPOSES AND SHALL BE PROPERLY COVERED AND SEALED TO PREVENT PHYSICAL DAMAGE AND MOISTURE INTRUSION DURING TRANSPORTATION AND STORAGE.<br><br>MANUFACTURER:_____<br>PLANT LOCATION: _____<br>MAKE/MODEL/PA RT NUMBER:_____<br>LEAD TIME A.R.O.: _____<br>(See expected delivery date page 1 of RFQ) | | |
| | **PLEASE QUOTE FULLY DELIVERED PRICE** | **PAYMENT TERMS** | **Total Delivered Price** |

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| Quantity | Description | Unit Price | Total |
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| 360,000 FT | CS0100014<br><br>CABLE, 1/C #8 AWG, 5KV, AIRFIELD LIGHTING CABLE, PRIMARY SERIES LIGHTING CABLE FOR AIRFIELD LIGHTING CIRCUITS, SHALL BE NON-SHIELDED 5000 VOLT RATED, TYPE B, COATED COPPER, CLASS-C, 7 STRANDS HAVING EXTRUDED SEMI-CON THERMOSETTING COMPOUND OVER STRANDS, ETHYLENE-PROPYLENE-RUBBER-INSULATED (ICEA S-96-659/NEMA WC71) AND PVC JACKETED IN COLOR YELLOW. THE CABLE SHALL COMPLY WITH FAA-AC 150/5345-7 (LATEST EDITION) AND SHALL BE APPROVED UNDER FAA SPECIFICATION L-824B. SHALL BE COMPATIBLE WITH AMERACE 54SUPER D4-D4 KIT OR APPROVED EQUAL WITH A MINIMUM OUTSIDE CABLE DIAMETER OF 0.320 INCH AND A MAXIMUM OUTSIDE DIAMETER OF 0.430 INCH. CABLE SHALL BE SUPPLIED ON NON-RETURNABLE REELS, 5000LF OF NON-PARALLEL SINGLE CONDUCTOR CABLE PER REEL.<br>OVERRUN TOLERANCE PER REEL: 5.0%<br>UNDERRUN TOLERANCE PER REEL: 0.0%<br>PER PA SECTION 260000 AND 261015. MANUFACTURERS: PRYSMIAN (DRAKA), OKONITE OR APPROVED EQUAL. BOTH CABLE ENDS SHALL BE ACCESSIBLE ON EACH REEL FOR TESTING PURPOSES AND SHALL BE PROPERLY COVERED AND SEALED TO PREVENT PHYSICAL DAMAGE AND MOISTURE INTRUSION DURING TRANSPORTATION AND STORAGE. | $ | $ |
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Signed_____Date_____

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# TERMS AND CONDITIONS

1. For the purposes of this Request For Quotations (RFQ), the terms ''Authority,'' ''Port Authority,'' or ''PA'' mean the Port Authority of New York and New Jersey and/or the Port Authority Trans Hudson Corporation (''PATH,'') as applicable.

2. The Port Authority reserves the right to request information relating to seller's responsibility, experience and capability to perform the work.

3. Prices must be quoted in United States Dollars. All figures inserted will be interpreted as being quoted in United States Dollars. Unless otherwise specified, unit prices shall be quoted to two (2) decimal places.

4. Unless otherwise provided, complete shipment of all items must be in one delivery FOB delivery point freight included. Payment will not be made on partial deliveries unless authorized in advance by the PA and any discount, if applicable, will be taken on the total order.

5. Inspection and acceptance will be conducted at the delivery point, unless otherwise provided. Any risk of loss will be the seller's responsibility until such delivery and acceptance is made, unless loss results from negligence of the Authority.

6. PA payment terms are net 30 days. Cash discounts for prompt payment of invoices may be quoted, but will not be considered in determining award.

7. Separate unit and total FOB delivered prices must be shown. In the event of a discrepancy between unit prices and total prices, unit prices will govern.

8. Sales to the PA and to PATH are currently exempt from New York and New Jersey State and local taxes and generally from federal taxation. The seller certifies that there are no federal, state, municipal or any other taxes included in the prices shown hereon.

9. The PA shall have the absolute right to reject any or all quotes or to accept any quote in whole or part and to waive defects in quotes.

10. Unless ''no substitute'' or ''no approved equal'' is indicated, seller may offer alternate manufacturer/brands, which shall be subject to Port Authority approval. Please indicate details of product being offered with its quote. Brand name or equal descriptions are used as a means to define the performance or other salient characteristics of procurements. In the subject RFQ, even if the phrase ''or approved equal'' is inadvertently omitted, it is implied after any brand name.

11. Acceptance of seller's offer will be only in writing, authorized by the PA. No changes shall be made to any agreement resulting from this RFQ, except in writing, authorized by the PA.

12. If the seller fails to perform in accordance with the terms of this RFQ, or the terms of any agreement resulting from this RFQ, the PA may obtain the goods or services from another contractor and charge the seller the difference in price, if any, a reletting cost of $100, per order included in this RFQ, plus any other damages to the PA.

13. The PA may cancel this RFQ at any time, when it is in the PA's best interest, via an addendum. The PA may terminate any agreement resulting from this RFQ, in accordance with terms and conditions of that agreement, in which case the successful seller (''Vendor'') shall be paid for items received and accepted, including shipping costs, if applicable, up to the time of termination, unless otherwise provided for in that agreement. The Vendor shall promptly submit its final invoice to the PA to be paid to the Vendor.

14. Upon request, sellers are encouraged to extend the terms and conditions of any agreement resulting from this RFQ with the PA to other government and quasi-government entities by separate agreement.

15. By signing this RFQ, the seller certifies to all relevant statements on Form PA 3764A (copy can be obtained at http://www.panynj.gov/business-opportunities/become-vendor.html), including but not limited to those relating to the submission of bids. As set forth on PA 3764A, the PA has adopted a policy that it will honor a determination by an agency of the State of New York or New Jersey that a seller is not eligible to bid on or be awarded public contracts because the seller has been determined to have engaged in illegal or dishonest conduct or to have violated prevailing wage legislation. The terms and conditions of PA 3764A will apply to any agreement resulting from this RFQ.

16. The Vendor may subcontract the services or use a supplier for the furnishing of materials required hereunder to such persons or entities as the PA, may, from time to time, expressly approve in writing. All further subcontracting shall also be subject to such approval by the PA. All persons to whom the Vendor subcontracts services shall be deemed to be its agents and no subcontracting or approval thereof shall be deemed to release the Vendor from its obligations under any agreement resulting from this RFQ.

17. The Vendor may not assign any subsequent agreement resulting from this RFQ without written consent of the PA.

18. The Vendor shall not issue nor permit to be issued any press release, advertisement, or literature of any kind, which refers to the Port Authority or that goods will be, are being or have been provided to it and/or that services will be, are being or have been performed for it in connection with this RFQ or any subsequent Agreement, unless the vendor first obtains the written approval of the Port Authority. Such approval may be withheld if for any reason the Port Authority believes that the publication of such information would be harmful to the public interest or is in any way undesirable.

19. Notwithstanding anything to the contrary, the seller acknowledges that the Port Authority's obligations, if any, under this RFQ, or any agreement resulting from this RFQ, are subject to the provisions of its Public Records Access Policy, and any amendments thereto, and any disclosure made pursuant thereto is not a violation of this RFQ. The Port Authority Public Records Access Policy can be found at https://www.panynj.gov/corporate/en/public-record-access.html, and is incorporated herein.

20. Neither the Commissioners of the Port Authority, nor Directors of PATH, nor any of them, nor any officer, agent or employee thereof, shall be charged personally by any seller with any liability, or held personally liable to any Contractor under any term or provision of this RFQ (or any agreement resulting from this RFQ), or because of its execution or attempted execution, or because of any breach, or attempted or alleged breach, thereof.

21. MBE/WBE/SDVOB GOOD FAITH PARTICIPATION - The Vendor shall use every good-faith effort to provide for participation by Port Authority Certified Minority Business Enterprises (MBEs), Port Authority Certified Women-owned Business Enterprises (WBEs) and Port Authority certified Service-disabled Veteran-owned Business Enterprises (SDVOBs) in all purchasing and subcontracting opportunities associated with any agreement resulting from this RFQ, including purchase of equipment, supplies and labor services.If this RFQ contains participation goals, the Vendor shall use good faith efforts to achieve the goals.

Good faith efforts to include and facilitate participation by MBE/WBE/SDVOBs shall include, but not be limited to the following:

A. Dividing the services and materials to be procured into smaller portions, where feasible.
B. Giving reasonable advance notice of specific contracting, subcontracting and purchasing opportunities to such MBE/WBE/SDVOBs as may be appropriate.
C. Soliciting services and materials from a Port Authority certified MBE/WBE/SDVOB. To access the Port Authority's Directory of MBE/WBE/SDVOB Port Authority certified firms go to http://www.panynj.gov/business-opportunities/sd-mwsdbe-profile.html.
D. Ensuring that provision is made to provide progress payments to MBE/WBE/SDVOBs as defined in the prompt payment provision below.
E. Observance of reasonable commercial standards of fair dealing in the respective trade or business.

22. If this solicitation has not been set aside for the purposes of making an award based on bids solicited from Port Authority certified Minority Business, Women Business, Small Business Enterprises or Service-disabled Veteran-owned Business Enterprises as indicated within this RFQ, a price preference of 10% is available for NY/NJ Minority and Women Business Enterprises (M/WBEs), 5% for NY/NJ Small Business Enterprises (SBEs), or 10% for Service-disabled Veteran-owned Business Enterprises (SDVOBs) certified by the Port Authority (PA) by the day before bid opening for awards not exceeding one million dollars ($1,000,000).

23. Non-Discrimination Requirements - The Vendor shall take all necessary and reasonable steps to ensure non-discrimination in the performance and administration of all aspects of any agreement resulting from this RFQ.

A. Vendor hereby agrees that no person on the ground of race, color, national origin, creed / religion, sex, age, or handicap / disability shall be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the furnishing of goods or services or in the selection and retention of subcontractors and /or vendors under any agreement resulting from this RFQ. Vendor shall also ascertain and comply with all applicable federal state and local laws, ordinances, rules, regulations and orders that pertain to equal employment opportunity, affirmative action, and non-discrimination in employment.
B. Vendor agrees that these "Non-Discrimination Requirements" are a binding part of any agreement resulting from this RFQ. Without limiting the generality of any other term or provision of this RFQ or any agreement resulting from this RFQ, in the event the Authority, or a state or federal agency finds that the Vendor or any of its subcontractors or vendors has not complied with these "Non-Discrimination Requirements," the Authority may cancel, terminate or suspend this RFQ or any agreement resulting from this RFQ.
C. Vendor agrees to cooperate fully with the Authority's investigation of allegations of discrimination. Cooperation includes, but is not limited to, allowing the Authority to question employees during the investigation of allegations of discrimination, and complying with directives that the Authority or the State or Federal government deem essential to ensure compliance with these "Non-Discrimination Requirements."

24. To the extent permitted by law, the Vendor shall indemnify and hold harmless the Port Authority, its Commissioners, Directors, agents, servants, officers, representatives and employees from and against all claims and demands, just or unjust, of third persons (including Vendor's agents, servants, officers, representatives and employees) arising out of or in any way connected to or alleged to arise out of or alleged to be in any way connected with any subsequent agreement resulting from this RFQ and all other services and activities of the Vendor under any subsequent agreement resulting from this RFQ and for all expenses incurred by it and by them in the defense, settlement or satisfaction thereof. The Vendor assumes the following risks, whether such risks arise out of or are in any way connected to the Vendor's operations or to its performance of work under any agreement resulting from this RFQ, or arise out of acts or omissions (negligent or not) of the Vendor, the Port Authority or third persons (including agents, servants, officers, representatives, Commissioners, Directors and employees of the Port Authority and the Vendor) or from any other cause, excepting only risks occasioned solely by affirmative willful acts of the Port Authority done subsequent to the opening of bids/quotes on this RFQ, and shall to the extent permitted by law indemnify the Port Authority for all loss or damage incurred in connection with such risks: (a) the risk of any and all loss or damage to Port Authority or Vendor property, equipment, materials and possessions, and those of Vendor's agents, employees, materialmen or others performing work under any agreement resulting from this RFQ, on or off the premises, the loss or damage of which shall arise out of the Vendor's operations under any agreement resulting from this RFQ; and (b) the risk of claims, whether made against the Vendor or the Port Authority, including those, whether just or unjust, of third persons (including agents, servants, officers, representatives, Commissioners, Directors and employees of the Port Authority and the Vendor), for any and all injuries, loss or damages occurring to any property, equipment, materials and possessions of the Contractor's agents, employees, materialmen and others performing work under any agreement resulting from this RFQ.

25. Seller's attention is directed to the Port Authority's "Code of Ethics for Port Authority Vendors" (the "Code"). The Code will be made apart of any agreement resulting from this solicitation. The Code can be found at https://www.panynj.gov/business-opportunities/become-vendor.html.

26. The PA has transitioned to an all electronic method of paying its vendors and contractors via an Automated Clearing House (ACH) funds transfer. The Vendor must complete the Port Authority's "Authorization Agreement For Direct Deposits And Direct Payments (ACH Credits)" form, which is available at http://www.panynj.gov/business-opportunities/become-vendor.html, in order to receive payment. To avoid delays in payments for commodities and services provided, vendors and contractors must be enrolled in ACH. The Authorization Agreement shall remain in full force and effect until the Port Authority has received written notification from the Vendor of its termination in such time and in such manner as to afford the Port Authority and the depository financial institution(s) a reasonable opportunity to act on it. Any questions on this initiative may be directed to the ACH Enrollments contact line at 201 216-6002 or emailed to ACHENROLLMENT@PANYNJ.GOV.

27. Prospective Bidders are advised that additional vendor information , including but not limited to, forms, documents and other information, including protest procedures, may be found on the Port Authority website at: http://www.panynj.gov/business-opportunities/become-vendor.html.

28. The Contractor shall provide its personnel, and shall require its subcontractors to provide their personnel, with Personal Protective Equipment (PPE) prior to entering the Facility, and shall replenish PPE periodically as appropriate. PPE is equipment worn to minimize exposure to hazards that may cause serious injuries and illnesses at the workplace. These injuries and illnesses may result from contact with biological, chemical, radiological, physical, electrical, mechanical, or other workplace hazards. PPE may include, but shall not be limited to, items such as face coverings, gloves, safety glasses, shoes, earplugs, muffs, hard hats, respirators, coveralls, vests and full body suits. The Contractor shall require its personnel, and shall require its subcontractors to require its personnel, to utilize such PPE as appropriate to the Facility and Work covered under the Contract or as may be required by the Port Authority. Regardless of the type of Work, face coverings are required to be worn at all times at all Port Authority Facilities, unless otherwise directed in writing by the Port Authority.

The Port Authority of New York and New Jersey (Port Authority), in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Additionally, all bidders (including proposers, and respondents, as applicable) are notified that the Port Authority will ensure that, with respect to any contract/agreement entered into pursuant to this advertisement, disadvantaged business enterprises, minority business enterprises and woman-owned business enterprises, as applicable, will be afforded full and fair opportunity to submit bids, proposals and responses, as applicable, in response to this invitation, and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

# DIVISION 26

# SECTION 260000

# ELECTRICAL GENERAL REQUIREMENTS

## PART 1. GENERAL

### 1.01 SUMMARY

Unless otherwise shown on the Contract Drawings, or unless otherwise specified in other Sections of the Specifications, the general requirements specified in this Section are applicable to all electrical Work of this Contract. Additional requirements applicable to individual Sections of the Specifications are specified in those Sections, and also may be shown on the Contract Drawings.

### 1.02 DESIGN AND PERFORMANCE REQUIREMENTS

A. Design and performance of components and methods specified herein shall comply with all applicable federal, state and local laws, ordinances, regulations and codes, and industry standards including, at a minimum, the entities listed below:

American National Standards Institute (ANSI).
ASTM International (ASTM).
Intertek Testing Lab (ETL).
Federal Aviation Administration (FAA.).
Factory Mutual (FM Approvals).
Institute of Electrical and Electronics Engineers (IEEE).
National Fire Protection Association (NFPA).
Occupational Safety and Health Administration (OSHA).

In addition, in case of a conflict between the referenced standards and the specific provisions specified herein, the specific requirements specified in this Section shall govern.

B. The electrical installation shall conform to all requirements of IEEE C2, NFPA 70, NFPA 70E, and the codes and standards specified in other Sections, all local codes and the requirements of OSHA, which would be applicable if the Authority were a private corporation.

C. Standards publications of technical organizations and regulatory agencies are referenced in other Sections, and unless stricter requirements are indicated, materials and equipment so specified shall be manufactured, tested and installed to conform, as a minimum, to the requirements of such reference standards and publications.

D. Installations for aeronautical markers, lighting, guidance signs, and other Work as shown on the Contract Drawings, shall comply with the standards of the Federal Aviation Administration (FAA), where applicable.

E. When shown on the Contract Drawings and where specified in other Sections of the Specifications, furnish and install seismic protection for electrical equipment and systems. Seismic protection shall comply with local building code.

F. In case of conflict between provisions of codes, laws and ordinances, the more stringent requirement shall apply. Codes shall be used as minimum requirements. Where Authority standards and specifications exceed the minimum code requirements, the more stringent requirement shall be followed.

1.03 QUALITY ASSURANCE

A. Any entity performing electrical installation Work shall have had experience on at least two projects involving quantities and complexities at least equal to those required under this Contract or the applicable Section thereof, within the last five years.

B. Each workman and entity performing electrical Work under this Division shall be skilled worker of the trade involved. Where such specialty Work, (e.g., splicing or welding) is required, submit proof of training, experience and work history for each workman and for each entity for review and approval by the Engineer. Only approved workmen and entities with Engineer approved training, experience and work history shall perform specialty Work.

C. All electrical Work at the construction site shall be performed under the supervision of qualified licensee whose license qualifies a business permit holder to engage in the business of electrical contracting in the state (and the city as required) in which the Work is to be performed. The supervisor or responsible representative shall be an experienced licensed employee of a firm performing the electrical Work. Submit a copy of the qualifying licenses for review and approval by the Engineer. The licensed individual under which the Work is performed shall have a minimum of three years' experience for the entity performing the Electrical Work. Should the licensed individual be replaced during the Work, notify the Engineer within three weeks of the replacement. No electrical Work at the construction site shall proceed without the Engineer's approval of the replacement licensed individual.

D. All calculations required by this and other electrical Sections of the Specifications, or as shown on the Contract Drawings, shall be certified and sealed by a Professional Engineer licensed in the state in which the Work is to be performed, and submitted to the Engineer for review.

E. Where electrical Sections of the Specifications include the requirement for the specified material or equipment to have been "satisfactorily manufactured and in use for purposes similar to those specified herein" or words of similar import and a statement that specifies the required experience time, such statements shall mean that the manufacturer of the material or equipment being furnished shall have manufactured similar material or equipment to that specified, for at least the time specified.

F. Where electrical Sections of the Specifications include a statement that refers to the length of required experience that must be satisfied, such statements shall mean that the individual or entity manufacturing or furnishing the specified material or equipment or performing the Work shall have done so for the at least the time specified.

G. Where electrical Sections for the Specifications include requirements for specific material or equipment to be "certified by the manufacturer", or words of similar import, proof of such certification shall consist of either the manufacturer's standard published product literature indicating the specified certification and bearing the name and logo of the certification agency or standard, or a letter from the manufacturer, on the manufacturer's letterhead, verifying that the products are certified in accordance with the specification requirements. Letters from vendors or distributors will not be acceptable.

H. Polyvinyl Chloride

1. Polyvinyl Chloride (PVC): PVC conduits, PVC insulated power wiring, and any items containing PVC, except PVC insulated wiring for communications systems, remote control, signaling and power limited circuits, shall not be installed in any indoor area. PVC insulated wiring for communications systems, remote control, signaling, and power-limited circuits shall be furnished and installed in accordance with NFPA 70.
2. PVC conduits shall not be used in any areas subject to the requirements of NFPA 130 or NFPA 502. PVC insulated or jacketed wiring and cabling shall not be installed in areas subject to the requirements of NFPA 130 or NFPA 502.

I. Asbestos

Asbestos or asbestos-containing materials shall not be furnished or installed for any electrical Work.

J. Conformance Labels

All electrical materials and equipment for which there is a nationally recognized standard shall bear the conformance labeling of the third party inspection authority, such as Underwriters Laboratories Inc., Factory Mutual, ETL, or other inspection and testing agency acceptable to the Engineer. Where the phrase "where there are established UL standards, shall bear the UL label" or words of similar import appear in electrical Sections of the Specifications, these requirements for the conformance label shall apply.

K. Area Classifications: Materials and equipment shall conform to the area classifications shown on the Contract Drawings. The locations and requirements shall be in accordance with the following, unless shown otherwise in other Sections of the Specifications for the Work of the Contract.

1. Materials, equipment and incidentals installed in corrosive areas shall meet NEC and NEMA requirements for corrosive locations. Enclosures installed in corrosive locations shall meet NEMA 4X requirements.
2. Materials, equipment and incidentals installed in hazardous locations shall meet NEC requirements for the Class and Division designated. Enclosures installed in hazardous locations shall be provided with stainless steel hardware and watertight gasket.
3. Materials, equipment and incidentals installed in dusty locations shall meet NEC and NEMA 12 requirements.
4. Materials, equipment and incidentals installed in outdoor locations shall be NEC and NEMA 4 requirements.

## 1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and equipment to the construction site complete in manufacturers' original unopened protective packaging. Where ever possible, all electrical devices and accessories shall be in place and pre-wired.

B. Materials and equipment shall be packaged to prevent damage due to vibration, jarring dirt, dust, water and weather during transportation and handling. Factory pre-assembled control panels, enclosures and terminal boxes shall be shimmed, braced, blocked and tied down to prevent distortion or other damage during transportation. Provide removable lifting hooks and pallet skids to allow for transport and rigging to installation location.

C. Affix labels on all packaging that clearly identify the manufacturer, product name, Port Authority Contract No., Work Order No. (if applicable), storage requirements and any other special instructions. If any electrical devices or accessories must be shipped loose, they shall be delivered in the manufacturer's original unopened protective packaging and shall be identified with suitable non-corrosive tag. Include instructions and wiring diagrams for field installation.

D. All materials and equipment shall be unloaded, uncrated, stored and handled in accordance with the manufacturer's instructions and requirements and in a manner to prevent deterioration or damage due to transport, rigging, moisture, temperature, contaminants, corrosion or other causes. Store components in clean and dry space protected from dirt, moisture and weather until installation. Where enclosures include space heaters, furnish temporary power to prevent condensation. Store materials off the ground to prevent damage from debris, pooling water or other contamination.

E. Handle materials and equipment in a manner to prevent damage to finished surfaces.

F. Where possible, maintain protective coverings until installation is complete and remove such covers as part of final cleaning.

G. Touch up any damage to finishes to match undamaged adjacent surfaces.

1.05 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment furnished shall be new and unused, prior to installation. Materials and equipment shall be first grade commercial quality and shall be essentially the standard, latest design cataloged products of a manufacturer regularly engaged in the manufacture of the products. Only those items specifically shown on the Contract Drawings as "relocate existing" or as Authority furnished shall be reused. Rebuilt or remanufactured equipment will not be permitted. End of life or unused surplus equipment no longer manufactured will not be permitted.

2.02 IDENTIFICATION

A. All parts of equipment, such as switchboards, panelboards, safety switches, motor starters, circuit breakers, time clocks, contactors and similar items shall be identified by name, function or control with laminated plastic nameplates consisting of two black sheets with one white sheet bonded to and between the two outer sheets and having letters machine engraved in the face sheet to the depth of the white plastic. Nameplates shall not be smaller than 1 inch by 3 inches with characters not less than 1/4 inch in height. Where letter sizes are not specified, use 1-inch high letters for panelboards, switchboards and motor control centers and 1/4-inch high elsewhere. Nomenclature shall be in accordance with a schedule approved by the Engineer.

B. All device plates except for lighting switch plates, telephone and 120 volt, single phase, 15 or 20 ampere receptacles, shall have black or white (as directed by the Engineer) silk-screened lettering Helvetica Medium type face (or other type face as directed by the Engineer) designating:

1. System.

2. Voltage (where applicable).
3. Number of phases (where applicable).
4. Current rating (where applicable).
5. Frequency (where applicable).

C. Submit a typewritten list to the Engineer for review and approval of nameplates or silk-screened device plates. Do not install nameplates that have not been approved by the Engineer.

D. Before placing orders for nameplates or silk-screened device plates, submit a typewritten list to the Engineer for review and approval.

E. Label the outside of the covers of all junction or pull boxes located above hung ceilings and the inside of the covers of all junction or pull boxes exposed with an indelible marker indicating the operating voltage and the system contained therein.

F. Label all device plates of receptacles connected to a standby or emergency power distribution system with an orange plastic nameplate, engraved with the panelboard and circuit number to which the receptacle is connected. Nameplate character engraved shall be not less than 1/4 inch in height.

## 2.03 SHOP FINISHING

A. Unless otherwise shown on the Contract Drawings, all panelboards, switchboards, switchgear, circuit breakers, switches and transformers connected to a standby or emergency power distribution system shall be finished Federal Safety Orange in color.

## 2.04 RUBBER MATS

A. Furnish continuous insulated rubber matting not less than 36 inches wide and not less than 1/4 inch thick in one piece in front of the following equipment, as applicable to the electrical Work of this Contract:

1. Substation transformers.
2. Switchgear.
3. Switchboards.
4. Motor control centers.
5. Panelboards.
6. On each side and end of a standby or emergency generator set.
7. Other locations as shown on the Contract Drawings.

B. Rubber mats shall conform to ASTM D 178, Type 2.

## 2.05 SOURCE QUALITY CONTROL

1. Perform factory tests for the following equipment in accordance with equipment Specification Sections for each of the following equipment, as applicable to the electrical Work of this Contract:
   a. High voltage cable splices and connections.
   b. Motor control centers.
   c. Switchgears.
   d. Switchboards.
   e. Panelboards.

f. Transformers.
g. Variable frequency drives.
h. Solid state starters.
i. Automatic transfer switches.
j. Manual transfer switches.
k. Motors.
l. Generators.
m. Custom control and alarm panels.
n. Programmable logic controllers.
o. Instrumentation and controls.

## PART 3. EXECUTION

### 3.01 GENERAL

A. Include all labor, material and apparatus necessary for the completion of all electrical work as shown on the Contract Drawings and as hereinafter specified, ready for satisfactory operation.

B. Coordination

1. Coordinate all Work as necessary to facilitate timely completion, avoid unnecessary cutting and patching and to ensure proper installation and operation of all equipment.
2. Coordinate the Work to minimize power shutdowns to the power distribution systems. Should any part of the Work require an "off-hours" shutdown in excess of eight hours, supply temporary services or feeders as required to maintain uninterrupted and continuous operation of the existing systems and equipment.
3. Ensure coordination between approved shop drawings, catalog cuts and instructions for electrical Work and construction of concrete bases, concrete encasement, anchor bolts, concrete inserts and other construction required to accommodate installations under other Sections of the Specifications.
4. Ensure that all wiring diagrams and other instructions required for proper electrical connection of equipment installed or furnished under other Sections of the Specifications is coordinated with the installation, wiring and connections for electrical material and equipment.
5. Coordinate arrangement, mounting, and support of electrical equipment to allow maximum possible headroom unless specific mounting heights that reduce headroom are shown on the Contract Drawings, to provide for ease of disconnecting the equipment with minimum interference to installations under other Sections of the Specifications, to allow right of way for piping and conduit installed at required slope, so connecting raceways, cables, wireways and cable trays will be clear of obstructions and of the working and access space of other equipment.
6. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
7. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.
8. Coordinate sleeve selection and application with selection and application of firestopping as required to provide appropriate fire rating of the installation.

C. The arrangement of electrical equipment and raceway runs as shown on the Contract Drawings and specified in other Specification Sections is schematic. Locate and install electrical Work in coordination with other Work of the Contract so that all electrical equipment and material is installed with working clearances in accordance with NFPA 70, local codes and regulations. Route raceways to avoid interference with existing installation and with other Work of the Contract.

D. The location of equipment and motors shown on the Contract Drawings is not exact and shall be subject to minor revisions due to site conditions or due to coordination with other Work, all without additional cost to the Authority. Prior to roughing-in, verify the exact location of all electrical connections to equipment and motors from approved shop drawings and by performing field verification.

E. Maintain records of all inspections, testing, overload and over-current settings throughout construction, and of any corrective actions taken, and submit such records to the Engineer for review.

F. All electrical Work shall be subject to inspection by the Engineer. Correct any deficient Work at no additional cost to the Authority.

G. Any equipment, materials, wiring or labor that are a necessary part of the electrical Work and its proper performance, although not specifically mentioned herein or shown on the Contract Drawings, shall be furnished and installed by the Contractor at no additional cost to the Authority as if specifically mentioned herein or shown on the Contract Drawings.

## 3.02 REMOVALS, RELOCATIONS, RECONNECTIONS AND RESTORATIONS

A. Remove and relocate existing equipment and materials where shown on the Contract Drawings.

B. Unless otherwise shown on the Contract Drawings, existing equipment and materials that are to be removed and not required to be relocated under this Contract or to be retained by the Authority, will become the property of the Contractor and shall be transported off Authority property, and properly recycled or disposed of. Disposal of equipment and materials shall comply with all local, state and federal laws and regulations.

C. If existing electrical feeders, wiring, conduit, lighting fixtures or equipment interfere with any Work of the Contract, reroute the existing electrical feeders, wiring and conduit or relocate the existing lighting fixtures or equipment in a manner approved by the Engineer to permit such Work. Where existing circuits or devices, or portions of the existing wiring system are to remain active but are interrupted by the construction, intercept, re-route or extend them outside or around the Work area or provide bypass wiring outside the Work area, as required to maintain uninterrupted and continuous operation of the system.

D. Protect adjacent building systems, services, materials and finishes that remain. Notify the Engineer immediately of any damage caused by the Contractor to existing wiring, services, feeders or systems which are to remain in service. Repair the damage in a workmanlike manner to restore to service, at no additional cost to the Authority.

E. To minimize shutdown periods, coordinate with the Engineer before shutdown or discontinuation of service on any circuit, system or feeder. Notify the Engineer in writing a minimum of two weeks before performing any shutdowns. The minimum notification period may be reduced with the express written permission of the Engineer.

## 3.03 LOCATION OF EQUIPMENT

A. Unless otherwise shown on the Contract Drawings, the location of outlets and devices, from finished floor to center of plate or device, for wall-mounted devices, and to bottom of devices for suspended items, shall be as follows:

1. Lighting switches: 48 inches.
2. Thermal switches: 48 inches.
3. Receptacles: 18 inches.
4. Telephone outlets: 16 inches.
5. Fire alarm stations: 48 inches.
6. Fire alarm horn/light signals: 7 feet 6 inches.
7. Fire alarm horn/light signals: The top of strobe lens shall be 6 inches below ceiling or bottom of strobe lens 80 inches above floor, whichever is lower.
8. Clocks: 7 feet 8 inches.

B. Unless otherwise shown on the Contract Drawings, the location of electrical equipment, from finished floor to top of enclosures shall not exceed 6 feet 6 inches.

1. In exposed interior or public locations, panelboards and enclosures shall generally be flush mounted, and all covers shall be identical in layout and size and shall be installed to maintain a level and straight top and bottom alignment, unless otherwise specified in other Sections the Specifications.
2. In concealed locations, and in closets or electrical or mechanical rooms, and non-public locations, panelboards and enclosures shall generally be surface mounted and shall be installed to maintain a level and straight top alignment, unless otherwise specified in other Sections of the Specifications.

## 3.04 RUBBER MATS

A. Install rubber mats in front of each panelboard, switchboard, motor control center, switchgear and substation transformers, and along each side and the end of each generator set, or as shown on the Contract Drawings.

B. Rubber mats, when installed, shall lay flat without curling.

## 3.05 CUTTING, PATCHING AND FIRESTOPPING

A. Perform all cutting and patching of existing construction required for installation of all electrical materials and equipment.

B. Perform all patching to match existing adjacent construction as specified in other Sections of the Specifications.

C. Firestopping shall be applied to all electrical penetrations of fire-rated floors, roofs, ceilings, slabs, walls and partitions using an Engineer-approved firestopping system to restore original ratings.

## 3.06 FIELD QUALITY CONTROL - FINAL

A. The entire electrical installation shall be inspected prior to final acceptance testing, and shall be thoroughly cleaned, damaged finishes touched and prior to final acceptance testing being performed. Not less than 30 days prior to the testing, furnish a test plan, to the Engineer for review and approval, outlining all aspects of the testing, including tests to be performed and the expected results.

B. Preform field and functional tests for equipment as specified in Division 26 Sections for the Work of the Contract.

## 3.07 PROTECTION AND SAFETY

A. During installation, energizing and testing of any equipment that may pose arc flash hazard, the Contractor shall establish and follow Electrical Safety and Arc Flash protection procedures in accordance with NFPA 70E and OSHA, as applicable.

B. For additional arc flash protection requirements see Division 26 Section on power distribution system short circuit coordination and arc flash study.

## 3.08 TRAINING

A. Provide training in accordance with other Sections of the Specifications for each item of equipment specified for this Contract.

END OF SECTION

## SECTION 260000

## ELECTRICAL GENERAL REQUIREMENTS

## APPENDIX "A"

## SUBMITTALS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of the GENERAL PROVISIONS:

A. Certificates

1. Training, experience and work history for certified splicers and welders.
2. Electrical contractor's license.

B. Calculations

1. Calculations certified and sealed by a licensed Professional Engineer in the state(s) where the Work is performed where required by the Specifications or the Contract Drawings. Submit a licensed Professional Engineer qualification, indicating experience in electrical calculations.

C. Manuals, Warrantees/Guarantees

1. Operation and maintenance manuals, where required by the Specifications or the Contract Drawings.

D. Qualifications

1. Workmen and electrical entities, training, experience and work history for certified splicers and welders.

E. Record Documents

1. One set of Contract Drawings revised, completed and brought up to date showing the permanent construction as actually made, and showing the exact location of all equipment and conduit runs, as actually installed.

## END OF APPENDIX "A"

# DIVISION 26

# SECTION 261015

# TAXIWAY/RUNWAY WIRES AND CABLES

## PART 1. GENERAL

### 1.01 SUMMARY

A. This Section specifies requirements for furnishing, installing, connecting and testing wires, cables, splices, terminations and accessories for airfield construction.

### 1.02 DESIGN AND PERFORMANCE REQUIREMENTS

A. Design and performance of components and methods specified herein shall comply with all applicable federal, state and local laws, ordinances, regulations and codes, and industry standards including, at a minimum, the entities listed below:

ASTM International (ASTM).
Federal Aviation Administration (FAA).
Institute of Electrical and Electronics Engineers (IEEE).
National Electrical Manufacturers Association (NEMA).
Military Specification (MIL).
National Fire Protection Association (NFPA).
Underwriters Laboratories (UL).

In addition, in case of a conflict between the referenced standards and the specific requirements specified herein, the specific requirements specified in this Section shall govern.

B. Airport lighting equipment and materials covered by FAA Advisory Circulars (AC) shall be approved under FAA's Airport Lighting Equipment Certification Program in accordance with FAA AC 150/5345-53 and installed in accordance with FAA AC 150/5340-30.

### 1.03 QUALITY ASSURANCE

A. Tests requiring factory witness or field inspection and those requiring certified test reports shall be conducted and reported to the Engineer in conformance with those standards specified in this Section.

B. Installations shall comply with the standards of the FAA where specified.

C. Wires and cables that have been manufactured more than two years prior to installation shall not be used in the Work of this Section.

D. All wires, cables, splices and terminations for which there are established UL standards, shall bear the UL label.

E. Entities performing the Work of this Section shall have the following qualifications:

1. The independent testing laboratory shall have at least three years of experience performing the required tests on similar cable types.

2. Each installer of splices shall have at least five years prior experience in performing medium voltage splices and shall have attended a training session by the splice kit manufacturer within the last 12 months. Each installer of splices shall also be capable of demonstrating splicing experience on at least two projects of a similar size, type and complexity as specified herein. These installations shall have been in satisfactory operation for a minimum of one year.

3. Each installer of exothermic welds shall be capable of demonstrating experience on at least two projects of a similar size, type and complexity as specified herein. These installations shall have been in satisfactory operation for a minimum of one year.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store material in a clean, dry space and protect from weather in accordance with manufacturers written recommendations.

1.05 SITE CONDITIONS

A. Environmental Conditions: For cold weather installation, if the Contractor opts to install wires and cables at temperatures below the wire and cable manufacturer's written minimum installation temperatures, prepare and submit for review by the Engineer a plan during installation for heated storage of the wires and cable and for maintenance of an acceptable wire and cable temperature.

1.06 SUBMITTALS

See Appendix "A" for submittal requirements.

## PART 2. PRODUCTS

2.01 WIRES AND CABLES

A. General

1. Locations, types, sizes and quantity of wires and cables shall be as shown on the Contract Drawings.

2. Unless otherwise shown on the Contract Drawings, solid conductors shall be soft or annealed copper, conforming to ASTM B 33 (tinned), ASTM B 189 (lead-coated or lead-alloy coated), or ASTM B 3 (uncoated).

B. 600 Volt Wires and Cables

1. Power Wires and Cables

Secondary series lighting wire and cable shall be factory assembled watertight thermoplastic or thermoset rubber insulated, or as otherwise shown on the Contract Drawings, and shall comply with FAA AC 150/5345-26.

2. Grounding and Counterpoise Wires and Cables
Unless otherwise shown on the Contract Drawings, grounding and counterpoise conductors shall be as follows:

a. Insulated Ground

(1) Solid copper for sizes No. 8 AWG and smaller; ASTM B 8, Class B stranded copper for sizes No. 6 AWG and larger.

(2) Insulation shall be a continuous green color, rated XHHW/XHHW-2, in accordance with NFPA National Electrical Code, Cross-Linked High Heat Water Resistant Insulated Wire and shall conform to UL 44.

b. Uninsulated Ground

(1) Solid for sizes No. 8 AWG and smaller; ASTM B 8, Class B stranded for sizes No. 6 AWG and larger.

(2) In Raceways: Soft-drawn and conforming to ASTM B 3.

(3) Direct Buried or Encased in Concrete: Soft-drawn, medium-hard-drawn or hard-drawn and conforming to ASTM B 1, B 2 or B 3, respectively.

c. Counterpoise

(1) Wire for counterpoise installations shall be No. 6 AWG bare solid copper wire for Authority systems and No. 1/0 AWG bare stranded copper wire for FAA installations. Counterpoise type and layout shall be as shown on the Contract Drawings.

C. 5000 Volt Insulated Wires and Cables

1. Primary series lighting wires and cable shall be non-shielded 5000 volt rated, Type 'B', single conductor, coated copper, Class C, 19 strands, Ethylene Propylene Rubber (EPR) insulated (ASTM D 2802 and ICEA S-96-659) and Polyvinyl Chloride (PVC) jacketed. The wire and cable shall comply with FAA AC 150/5345-7.

2. Where the Contract Drawings show two wires of a single circuit in the same conduit, the two wires shall be single conductor on a cable reel.

a. For installations at Newark Liberty International Airport, one of the two wires shall have a continuous yellow colored insulation.

b. Isolation transformers shall be connected only to the solid black wire.

3. Wires and cables shall be compatible with "54Super D4-D4 Kit" as manufactured by Amerace, or approved equal, with a minimum wire diameter of 0.320 inches and a maximum diameter of 0.430 inches. Wire diameter refers to overall outside diameter.

## 2.02 SPLICING AND TERMINATING

A. General

1. All materials for making splices and terminations shall be specifically designed for use with the type of wire or cable, insulation, and installation and operating conditions of the specific application.

B. Power Wire and Cable Splices

1. Connector shall be insulated compression (indenter) type as shown on the Contract Drawings.

2. Silicone sealant shall be type as shown on the Contract Drawings.

3. Heat shrinkable tubing shall be either irradiated modified polyvinyl chloride or irradiated polyolefin as shown on the Contract Drawings.

C. Secondary Series Lighting Wire/Cable Connectors

1. Double pole plug and receptacle connectors for the secondary series lighting wire/cable system shall comply with FAA AC 150/5345-26. Secondary connectors shall be factory molded onto wire/cable and shall be in accordance with FAA AC 150/5345-26, Figure No. 1, unless otherwise shown on the Contract Drawings.
2. Plug and receptacle types and styles shall be compatible with the equipment shown on the Contract Drawings.

D. Primary Series Lighting Wire/Cable Connectors

1. Single pole plug and receptacle connectors for the primary series lighting wire/cable system shall comply with FAA AC 150/5345-26, Figure No. 3.
2. Single pole plug and receptacles shall be as shown on the Contract Drawings. Coordinate the connector size for use with the wire/cable.
3. Cold shrink tape, heat shrink tape and electrical tape shall be as shown on the Contract Drawings.

E. Cable Tags

1. Stainless steel metal tags, 25 gauge, 3/4-inch wide, embossed with letters and numerals 5/16-inch high fastened to the wire/cable at both ends of tags with nominal 1/16-inch diameter monel metal wire or stainless steel cable ties.

## 2.03 SHOP TESTING

A. General

1. Factory or in-plant and independent laboratory tests shall be in conformance with the applicable standards of ASTM, FAA, NEMA, NFPA and UL and as specified in this Section. All testing, and the results thereof, shall be certified in writing to the Engineer.

B. Factory or In-Plant Inspection and Testing

1. Factory inspection and witnessing of tests by the Engineer is required for all taxiway/runway wires and cables furnished under this Section. The Engineer reserves the right to require additional factory tests, at no additional cost to the Authority, if the initial tests are not satisfactory. The Engineer reserves the right to waive factory inspection or witnessing of tests.
2. Notify the Engineer 14 days in advance of such factory tests.
3. 600 Volt Insulated Wires and Cables
    a. Perform dielectric voltage-withstand and insulation- resistance in water tests for wires and cables in accordance with UL 44.
    b. Perform flame tests for wires and cables in accordance with IEEE 383.
4. 5000 Volt Insulated Wires and Cables
    a. Perform tests for wires and cables in accordance with FAA AC 150/5345-7 and ICEA S-96-659.

C. Independent Laboratory Testing

Engage the services of an independent testing laboratory to perform the following tests. Testing is not required for a previously certified cable if successful testing has been performed by the same manufacturer for the identical cable using identical materials. Certified test data to be substituted for factory testing, if any, shall be submitted to the Engineer for approval prior to testing.

1. Specific Surface Resistivity

Test the specific surface resistivity of the cable jacket, which shall have a value greater than 200,000 megohms under all of the following conditions. Record the values of the specific surface resistivity of the cable jacket obtained and plot the values to demonstrate stability over time.

a. As manufactured.

b. After immersion in tap water at 30 degrees C for 28 days with measurements performed after the first day and then every 7 days.

c. After immersion in a 50/50 solution of potassium acetate (KAc) deicer and tap water at 30 degrees C for 28 days with measurements performed after the first day and then every 7 days.

2. Drip Track Resistance

Using apparatus described in ASTM D 2303, test the drip track resistance of the cable jacket, which shall pass as follows:

a. Quantity of Samples: Six, after immersion for 28 days in KAc and tap water solution.

b. Wetting Solution: 50/50 KAc and tap water.

c. Wetting Rate: 0.2 cu. cm. per minute.

d. Applied Voltage Steps: 100 volts per 30 minutes.

e. Initial Tracking Voltage: Greater than 1000 volts (median value).

Airport lighting cables that satisfy the above requirements should bear the following jacket printing:

"Cable Manufacturer" FAA L-824 Type B.

## PART 3. EXECUTION

### 3.01 PREPARATION

A. Inspect raceways and conduits prior to installation of wires and cables and notify the Engineer in writing of any conditions that would prevent the proper installation of taxiway/runway wires and cables as specified in this Section.

B. Prior to pulling wires and cables, clean the raceway systems of all foreign matter and perform all operations necessary so as not to cause damage to wires and cables while pulling.

C. Prior to pulling wires and cables into underground conduit systems, place a feeder tube approved by the Engineer at the entrance end of each such system.

## 3.02 INSTALLATION

A. Wires and Cables

1. General

a. Wire and cable installation shall be in accordance with manufacturer's written instructions. During cold weather, strictly follow wire and cable manufacturer's minimum installation temperature. Do not install wires and cables when the temperature is at or below the manufacturer's minimum installation temperature, unless a wire and cable heated storage plan has been submitted for approval by the Engineer in accordance with 1.05 A herein.

b. Install wires and cables in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering.

c. Seal the ends of all cables with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternatively seal the ends with heat shrinkable tubing, before pulling wires and cables into the conduit. Leave ends sealed until connections are made.

d. Where more than one cable is being installed in the same raceway or conduit, pull all cables simultaneously.

e. Pulling a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's written instructions. Where required, use a non-hardening cable-pulling lubricant recommended by the cable manufacturer for the type of cable being installed.

f. Before splicing or terminating wires and cables, make a thorough inspection to determine that water has not entered the wires and cables and that the wires and cables have not been damaged.

g. If required by the Engineer, the Contractor shall submit to the Engineer the maximum pulling tension value, in accordance with the cable manufacturer's written instructions, prior to any cable installation. Pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the Engineer. Record cable pull tensions and submit for review by the Engineer. Cables exposed to pulling tension exceeding the cable manufacturer's maximum allowable pulling tension values shall be removed and replaced by the Contractor at no additional cost to the Authority.

2. 600V Insulated Wires and Cables

a. Use 600V wires and cables for the connection of aeronautical light fixtures and signs to the secondary side of isolation transformers.

b. Leave sufficient slack in each wire and cable run, with a minimum as follows:

(1) Three feet in base cans.

(2) Six feet in manholes and handholes.

3. 5000 Volt Series Lighting Wires and Cables

a. Use 5000V series lighting wires and cables for connection of the airport constant current regulator output to the primaries of the isolation transformers for aeronautical lighting and signs.

b. Leave sufficient slack in each wire and cable run, with a minimum as follows:

(1) Fifteen feet in manholes.

(2) Ten feet in handholes.

(3) Six feet, three feet on each side of isolation transformers, in base cans. Isolation transformers shall be connected only to solid black wire.

4. Counterpoise Conductors

a. Where an existing airfield lighting system is shown on the Contract Drawings as being extended or modified, counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the newly installed counterpoise system and existing airfield lighting counterpoise system.

b. Counterpoise installation shall be as shown on the Contract Drawings.

B. Connecting and Terminating

1. 600V Insulated Wires and Cables

a. Install connections and perform terminations in accordance with the manufacturer's written instructions.

b. Wrap all joints where the connectors come together with at least one layer of rubber tape and one layer of plastic tape, one-half lapped, extending at least 2 inches (38 mm) on each side of the joint.

c. Rubber tape shall comply with ASTM D 4388 and plastic tape shall comply with MIL-I-24391.

2. 5000 Volt Series Lighting Cables

a. Splices and Connections at Isolation Transformers

(1) At each isolating transformer for aeronautical lights and signs and where shown on the Contract Drawings, the primary connectors shall consist of an assembly of L-823 single pole plug and receptacle cable connectors that comply with FAA AC 150/5345-26 Specification No. L-823.

(2) Install the L-823 connectors as shown on the Contract Drawings.

(3) The receptacle shall be installed at one end of the cable and the plug at the other end to establish a continuous plug and receptacle sequence through the wiring system and its associated isolation transformers.

(4) Precautions shall be taken to release trapped air when inserting the plug in the receptacle. After the joint has been made and wiped clean of excess jelly, cold shrinkable insulation tubing, and either heat shrinkable insulation tubing or plastic tape, shall be installed at the joint as shown on the Contract Drawings.

(a.) Install cold shrinkable insulation tubing and heat shrinkable insulation tubing in accordance with the manufacturer's written instructions. Clean cable surfaces within the limits of the shrinkable tubing application to be free of contaminates prior to application. Direct flame heating is not permitted, unless recommended in writing by the shrinkable insulation tubing manufacturer.

(b.) Heat shrinkable insulation tubing interior shall be coated with elastic mastic to assure a watertight seal after shrinking.

b. Splicing and Connections

(1) Where the primary series lighting cables are run through or into base cans, handholes or manholes, without connection to an isolation transformer, a plug and connector type installation, as specified in 3.02 B.2.a, shall be installed only when required for cable pulling. Additional connectors on home run, feeder and return cables shall be installed as shown on the Contract Drawings.

(2) The maximum lengths of uncut wires and cables shall be limited to the lengths of the wire and cable that can be installed without damage and the length of cable on each cable reel.

3. Exothermic Welds to Counterpoise and Ground Conductors

a. Only workers experienced in and regularly engaged in performing this type of work shall make these connections.

b. Contractor shall demonstrate to the satisfaction of the Engineer the welding kits, materials and procedures to be used for welded connections prior to performing any welding at the construction site. The installations shall be in accordance with the welding kit manufacturer's written instruction.

c. Remove all slag from welds and light base cans.

d. Thoroughly coat all buried copper and weld material at weld connections with 6 mm of "Scotchkote" as manufactured by 3M, or approved equal, or with coal tar bitumastic material, to prevent surface exposure to corrosive soil or moisture.

C. Identification of Wires and Cables

1. Each wire and cable shall be identified by its circuit in all cabinet boxes, base cans, manholes, handholes, wireways and other enclosures or access locations, and at all terminal points.

2. The circuit designations shall be as shown on the Contract Drawings. Tags shall be attached to wires and cables in such a manner as to be readily visible.

3. Wire and cable tags shall be fastened to the wires and cables at both ends of installed L-823 connectors.

## 3.03 FIELD TESTING

A. The Contractor shall perform the following field tests in the presence of the Engineer, to demonstrate the reliability of the taxiway/runway wires and cables installation.

B. Perform tests on the cables in accordance with FAA AC 150/5340-30:

1. Verify that all circuits are properly connected according to applicable wiring diagrams.

2. Confirm that all lighting power and control circuits are continuous and free from short circuits.

3. Confirm that all circuits are free from unspecified grounds.

4. Test installations by operating the affected series lighting circuits continuously for up to 24 hours, as directed by the Engineer. Notify the Engineer at least 7 days prior to scheduling the test. During this operating test period, change the intensity of variable intensity components to confirm and demonstrate the proper operation.

5. Test base cans for proper grounding. This test shall include a check to determine that the resistance to ground on any part of the grounding or counterpoise systems does not exceed the resistance specified in the Contract Drawings.

C. Test all series lighting cables and circuits with a 5000-volt megohmmeter. Where connecting a newly installed cable to existing cable, insulation resistance tests shall be performed on the newly installed cable prior to connection to the existing circuit. Insulation resistance test equipment shall be battery operated. All testing shall be performed for one-minute durations. Take readings after circuits have been de-energized for several hours. Perform the following test procedure on all installed series lighting circuits. Testing requirements for existing cables shall be as shown on the Contract Drawings.

1. Remove all electrical power from the cable being tested. Cover one end of the cable with an insulator to prevent the cable from accidentally shorting to ground and thereby giving a false reading.

2. Attach the positive (+) end of the megohmmeter to the exposed end of the bare copper cable. Connect the ground wire from the meter to the ground of the electrical system, a ground wire or ground electrode.

3. Switch the meter to the "ON" position. Press the charge button or meter button designated to perform the charge function to commence the testing as described in the operating manual for the megohmmeter. Observe the meter for one minute. Once the readings stabilize, record the final value.

4. The testing shall use the step voltage method, using a minimum of three voltage levels; 1000 volts, 2500 volts and 5000 volts. Sufficient time shall be allowed for charging currents to subside. Minimum insulation values shall be met at any and all voltage levels. See 3.03 C.6 below for calculation of minimum insulation values. Any insulation resistance values less than 50 megohms shall be investigated by the Contractor. Furnish a written record of all tests to the Engineer before acceptance of the installation. Records shall include date and time of testing, test voltage levels and megohmmeter reading results.

5. Perform tests following strict adherence to the Contract requirements and the equipment manufacturer's written instructions. All safety and operating rules shall be strictly observed and enforced.

6. Use the following formulas to calculate the minimum insulation resistance for each full or partially installed circuit:

$$IR = \frac{1}{\frac{L}{Rc} + \frac{Ns}{Rs} + \frac{Nt1}{Rt1} + \frac{Nt2}{Rt2}}$$

Where:

$$Rc = K * Log\left(\frac{D}{d}\right) * 1000$$

IR = Minimum insulation resistance for the installed circuit.

Rc = L-824B cable insulation resistance per foot.

K = Specific insulation resistance in mega ohms per 1000 feet at 60 deg F, K for Ethylene Propylene Rubber (EPR) insulation. Use 20,000 mega ohms, or as per manufacturer specifications.

D = Outer diameter of cable with insulation.

d = Outer diameter of bare copper wire.

L = Total length of L-824B cable.

Ns = Quantity of L-823 connector splices (including all splices on return cable and homerun cable).

Rs = Insulation resistance of each splice. Use 75,000 MΩ (FAA AC 150/5345-26) or per manufacturer.

Nt1 = Quantity of isolation transformers 150W and smaller.

Rt1 = Insulation resistance of each isolation transformer (for transformers up to 150W). Use 7,500 MΩ (FAA AC 150/5345-47) or per manufacturer.

Nt2 = Quantity of isolation transformers over 150W.

Rt2 = Insulation resistance of each isolation transformer (for transformers larger than 150W). Use 3,000 MΩ (FAA AC 150/5345-47) or per manufacturer.

D. Unless otherwise shown on the Contract Drawings, all labor, materials and power required for the above tests shall be furnished by the Contractor. Only power for the operating test for installed fixtures, signs and circuits will be furnished by the Authority.

E. Should the foregoing test results reveal any defects in taxiway/runway wires and cables installed under this Contract, promptly correct such defects at no additional cost to the Authority and rerun the test until the entire installation is satisfactory to the Engineer in all aspects.

F. If any defects in existing equipment or materials are disclosed by the foregoing tests, the Contractor shall so notify the Engineer.

END OF SECTION

## SECTION 261015

## TAXIWAY/RUNWAY WIRES AND CABLES

## APPENDIX "A"

## SUBMITTALS

Submit the following in accordance with the requirements of "Shop Drawings, Catalog Cuts and Samples" of the GENERAL PROVISIONS:

A. Catalog Cuts
   1. Primary series lighting cable.
   2. Grounding cable.
   3. Counterpoise cable.

B. Manufacturer Test Reports
   1. Results of the dielectric voltage-withstand and insulation-resistance in water tests for wires and cables in accordance with UL 44.
   2. Results of flame tests for wires and cables in accordance with IEEE 383.
   3. Results of tests for 5kV series lighting wires and cables in accordance with FAA AC 150/5345-7 and ICEA S-96-659.
   4. Certified independent laboratory test report for wires and cables in accordance with 2.03 C of this Section.

C. Construction and Installation Procedures
   1. Cable-pulling plan, in accordance with 3.02 A.1 of this Section, including equipment catalog cuts and calibration results.
   2. Plan during installation for heated storage of the wires and cable and for maintenance of an acceptable wire and cable temperature.

D. Calculations
   1. Submit calculated insulation resistance values for airfield circuits to be used as the minimum insulation resistance values for installed cable in accordance with 3.03 C.6 of this Section.

E. Qualifications
   1. Independent testing laboratory qualifications.
   2. Splice installer qualifications.
   3. Exothermic welder qualifications.

F. Inspection Reports
   1. Cable pull tension values in accordance with 3.02 A.1.g of this Section.
   2. Ground resistance values in accordance with 3.03 B.5 of this Section.
   3. Megger test results in accordance with 3.03 C of this Section.

END OF APPENDIX "A"