

Metropolitan Washington Airports Authority
PROCUREMENT AND CONTRACTS DEPT.
AMENDMENT OF SOLICITATION

Metropolitan Washington Airports Authority Procurement and Contracts Dept., MA-29 2733 Crystal Drive Arlington, VA 22202	1A. AMENDMENT OF SOLICITATION NO.	1B. DATED
	IFB-19-13327	June 27, 2019
	2A. AMENDMENT NO.	2B. EFFECTIVE DATE
	Three (0003)	August 13, 2019

The solicitation identified in Block 1A is amended as set forth in Block 3. Hour and date specified for receipt of offers is extended, is not extended. Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) by completing Block 4 and returning copy of the amendment; (b) by acknowledging receipt of this amendment on the Solicitation Offer and Award Sheet, Block 13. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.

3. DESCRIPTION OF AMENDMENT

The Metropolitan Washington Airports Authority Solicitation IFB-19-13327, entitled "5kV South Distribution Center Relocation and Replacement Project at Ronald Reagan Washington National Airport" is amended as follows:

1. **Deadline for bid submission is extended to 2:00 P.M. August 22, 2019.**
2. Section X, Attachment 01, Specifications, **Section 260513 – Medium-Voltage Cables** is revised with the attached Section 260513 dated July 26, 2019. Section 260513 was revised to remove the statement for ***"Strand Filling: Conductor interstices are filled with impermeable compound"*** (section 2.2, Medium-Voltage Cable, Letter I.).

All other terms and conditions of the solicitation remain unchanged.

Except as provided herein, all terms and conditions of the document referenced in Block 1A, as heretofore changed, remain unchanged and in full force and effect.

4A. NAME AND TITLE OF OFFEROR	4B. SIGNATURE	4C. DATE

SECTION 260513 – MEDIUM - VOLTAGE CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes single conductor cables and splices, terminations, and accessories for electrical distribution systems nominally rated 5 KV.

1.3 SUBMITTALS

- A. Product data on cables and cable accessories including descriptions and detailed specifications.
- B. Shop drawings of splices and terminations.
- C. Product certificate signed by manufacturer that its products comply with the specified requirements.
- D. Installer certificates signed by manufacturer of cable splicing and terminating products that Installers comply with training requirements specified under "Quality Assurance."
- E. Installer certificates signed by Contractor certifying that the Installers of cable splices and terminations meet the experience qualifications specified under "Quality Assurance."
- F. Product Test Reports: Certified reports of manufacturers' factory production and final tests indicating compliance of cable and accessories with referenced standards and this specification.
- G. Report of Field Tests: Certified copies of field test records.
- H. Maintenance data for cables and accessories for inclusion in Operation and Maintenance manual specified in Division 01."

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer of medium-voltage electrical cable to perform the installation specified in this Section. Engage Installers who are experienced in cable splices and terminations for the specific types of cable and cable accessories specified in this Section. All persons engaged in preparing, splicing or terminating medium voltage cable shall be qualified. All splicers/terminators shall be approved by the COTR or have a certificate from a school which teaches splicing and terminating of solid dielectric cable with the types of splices and

terminations specified below. At the option of the COTR the splicer/terminator may be required to prepare a representative sample splice and/or termination prior being permitted to make permanent connections on the project. Refer to Division 01 Section "References" for definition of experienced Installer.

- B. Field Testing Organization Qualifications: To qualify for acceptance, an independent testing organization must demonstrate, based on evaluation of organization-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct satisfactorily the testing indicated.
- C. Electrical Component Standard: Components and installation shall comply with NFPA 70 "National Electrical Code."
- D. IEEE Compliance: Comply with applicable IEEE standards including C2 "National Electrical Safety Code."
- E. UL Compliance: Cables and components shall be listed and labeled by UL.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver medium-voltage cable on factory reels conforming to NEMA Standard WC 26, "Wire and Cable Packaging."
- B. Store cables on reels on elevated platforms or on a hard surface in a clean, dry location. Stand reels vertically so that weight is supported by flanges.
- C. Prevent impact damage by: aligning reels flange to flange, using guards across flanges when different reel sizes are stored together, maintain adequate aisles and barricades to prevent equipment from hitting the cable. Protect cable from liquid spills. Advise splicers, installers and handlers of special instructions.
- D. Seal the ends of all cable stored outdoors with heat-shrinkable cable end caps and reseal both ends when a length is cut from the reel.
- E. Cable Inspection: 1) check for shipping damage prior to accepting cable, 2) confirm cable specified was received, and 3) reseal cable ends.
- F. Handling: 1) remove nails and staples from reel flanges, 2) calculate and observe recommended bending radii, 3) use swivels and avoid overruns when unreeling.

1.6 WARRANTY

- A. Special Project Warranty: Submit a written warranty, mutually executed by manufacturer and the principal Installer, and agreeing to repair or replace medium-voltage cables, splices, and terminations that fail in materials or workmanship within the special project warranty period specified below. This warranty shall be in addition to, and not a limitation of, other rights and remedies the Authority may have against the Contractor under the Contract Documents.

- 1. Special Project Warranty Period: 30 years beginning on the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. Cable:
 - a. The Kerite Co.
 - b. The Okonite Co.
 - c. Prysmian Cable Corp.
 - d. Southwire
 2. Cable Splicing and Terminating Products and Accessories:
 - a. Cooper Power Systems
 - b. Electrical Products Division 3M
 - c. Elastimold
 - d. Raychem Corp.
 3. Compression Connectors:
 - a. AMP
 - b. 3M Company
 - c. Burndy
 - d. Thomas & Betts
 - e. Anderson Electrical Connectors
 4. Arc Proofing Products:
 - a. 3M products
 - b. Scotch

2.2 MEDIUM-VOLTAGE CABLE

- A. General: Cable shall be single-conductor type, 5kV, 133% insulation level. Cable shall conform to UL Standard 1072 Type MV-105, AEIC CS.8, ICEA S-93-639, and ASTM B-8.
- B. Cable shall be ethylene propylene rubber (EPR) insulated.
- C. Conductor: Uncoated soft, Class B, stranded compressed concentric round. Copper shall conform to ASTM B-8. Electrical resistance shall meet requirements of ICEA S-93-639.
- D. Conductor Shield: Extruded layer of semi-conducting thermosetting compound. The shield shall be clean stripping from the conductor and bonded to overlying insulation.
- E. Insulation: Shall be flexible thermosetting dielectric based on an ethylene propylene elastomer. The insulation shall limit degree of susceptibility to treeing experienced by crystalline materials.

Insulation thickness at any cross-section of insulation shall not be less than 90% of the following minimum average thickness: 5 KV - 115 mil.

- F. Insulation Shield: Clean stripping extruded semiconducting compound applied over insulation. Electrical and physical requirements conforming to ICEA S-93-639, AEIC CS.8 and UL 1072.
- G. Metallic Shielding Metallic Shielding Copper shielding tape, 5 mil in thickness helically applied over the semi - conducting insulation shield, with 12-1/2% overlap.
- H. Jacket: Shall be black, sunlight resistant polyvinylchloride with minimum average thickness of 80 mils. Minimum thickness shall not be less than 64 mils.
- I. Operating Temperature: 105 °C continuous, 140 °C emergency, 250 °C short circuit.
- J. Production Tests: The cable shall be subjected to the following tests:
 - 1. Conductor shall meet resistance requirements of ICEA-S-93-639,
 - 2. Insulation resistance shall be tested in accordance with ICEA S-93-639 to be not less than 50,000 megohms - 1,000 feet,
 - 3. High voltage AC and DC test performed per ICEA S-93-639,
 - 4. Full reel corona test performed per AEIC CS.8 (x-y recording graph shall be furnished showing test results).

2.3 SPLICING AND TERMINATING PRODUCTS

- A. General: Comply with the following standards:
 - 1. IEEE 48: "Standard Test Procedures and Requirements For High Voltage Alternating Current Cable Terminations 2.5 KV Through 765 KV."
 - 2. IEEE 400: "Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems".
 - 3. IEEE 404: "Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2500 V to 500,000 V".
 - 4. IEEE 592: "Exposed Semi-conducting Shields on High Voltage Cable Joints and Separable Insulated Connectors."
 - 5. UL 486A-486B: "Wire Connectors and Soldering Lugs for Use with Copper Conductors."
 - 6. IEEE 386: "Separable Insulated Connector Systems for Power Distribution Systems above 600 V".
- B. Types: Compatible with the cable materials. All current carrying components shall be copper.
- C. Connectors/Lugs: Compression type, two hole, long barrel, seamless, tin plated copper, listed per UL486A-UL486B.
- D. Splicing and Terminating Kits: As recommended by the manufacturer in writing for the specific sizes, ratings, and configurations of cable conductor, splices, and terminations specified. Kits shall contain all components required for a complete splice or termination including detailed instructions and shall be the product of a single manufacturer. Completed splices and terminations shall provide insulation equivalent to the insulation class of the cable it connects.

- E. Splices: Comply with IEEE 404; shall be made with standard splicing kits as recommended by cable or splicing kit manufacturer for the application. Splice kits shall contain all necessary components to reinstate primary cable insulation, metallic shielding and grounding systems and overall jacket to the equivalent of the cable itself. The splice shall provide a permanent, fully-shielded, fully submersible cable joint with a continuous current rating equal to the rating of the cable used. Voltage rating of separable splice shall be 5KV for use on 5 KV systems. The splice kit shall be one of the following types:
1. Heat shrink splice kit of uniform cross-section polymeric construction with outer heat shrink jacket.
 2. Pre-molded, cold shrink rubber, in-line splice kit.
 3. Separable multiway insulated splice system, 900 amp, with capacitive test point on molded T-body and with all components for the required splice configuration. Voltage rating of separable splice shall be 5KV for use on 5 KV systems. All current carrying and mating components shall be copper.
- F. Dead break Junctions: Dead break junctions shall have four 900A dead break interfaces bused together with copper bus and encapsulated in a precision molded peroxide cured EPDM insulated rubber body with a semiconductive outer shield. Junctions shall meet the requirements of ANSI/IEEE 386, and be equipped with stainless steel mounted bracket with 2 parking stands. When mated with a compatible product, the junction shall provide a completely shielded, submersible threaded connection. Unused interfaces shall be covered with insulated protective caps of the same manufacturer as the junctions. All current carrying and mating components shall be copper.
- G. Shielded-Cable Terminations: Comply with Class 1, IEEE Standard 48. Insulation class shall be equivalent to that of the cable upon which they are installed. Terminations for shielded cables shall include a shield grounding strap. Include an effective moisture seal for the end of the insulation whether or not this item is included in termination kits. Seal shall be silicone rubber tape, cold shrink rubber sleeve, or heat shrink plastic sleeve as recommended by the kit manufacturer. Termination kits shall be performance tested for compliance with IEEE Standard 48 and shall be of the following types:
1. Class 1 Termination for Shielded Cable: Modular type, furnished as a kit, with stress relief tube, multiple molded silicone rubber insulator modules, shield ground strap, and compression type connector.
 2. Class 1 Termination for Shielded Cable: Heat shrinkable type with heat shrinkable inner stress control and outer non-tracking tubes, multiple molded non-tracking skirt modules, and compression type connector.
 3. Separable insulated elbow connectors: Modular system, complying with IEEE Standard 386. System shall consist of disconnecting, 900A, 3 phase rated, single pole, cable terminators and matching stationary, plug-in, dead front terminals. System components shall be designed for the system voltage and for sealing against moisture. Elbows shall include voltage test points on molded connector body. Voltage rating of separable elbow connectors shall be 5 KV. All current carrying and mating components of the separable connector shall be copper.
- H. Test-Point Fault Indicators: Applicable current-trip ratings and arranged for installation in test points of separable connectors, and complete with self-resetting indicators capable of being installed with shotgun hot stick and tested with test tool.

- I. Tool Set: Provide shotgun hot stick with energized terminal indicator, fault-indicator test tool, and carrying case.

2.4 PROTECTIVE CABLE END CAPS

- A. Protect MV cables from water penetration on job site, before, during and after cable pulling. Seal cable ends with heat-shrinkable end cap. This cap shall remain in place until the actual time of termination. Sealing compounds and/or taping shall not constitute acceptable environmental protection. End sealing caps shall be as produced by Raychem Corporation, Type ESC, or approved equal.

2.5 ARC-PROOFING MATERIALS

- A. Arc-proofing tape shall consist of a UL-listed fire proofing tape. Tape shall be flexible, conformable, intumescent to 0.3-inches thick, and compatible with the cable jacket on which used. Tape shall be self-extinguishing and shall not support combustion.
- B. Glass cloth tape shall be pressure-sensitive adhesive type, 1-inch wide.

2.6 SOURCE QUALITY CONTROL

- A. Test and inspect cables according to ICEA S-97-682 before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine raceways, cable trays, pull boxes, manholes, junction boxes, and other cable installation locations for cleanliness of raceways, minimum bending radii of cables, and conditions affecting performance of cable. Pull a mandrel of not less than 80% of the diameter of the inside of the duct and a bristle brush through raceways to check for suitable conditions. Do not proceed with cable installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Install cable accessory items in accordance with manufacturer's written instructions and as indicated.
- B. Notification: Notify COTR 24 hours prior to commencement of all cable pulls.
- C. Medium voltage cables shall be installed without any splices between terminations at equipment on both ends, except as indicated on the Contract Drawings.

3.3 INSTALLATION OF CABLES

- A. Pull conductors simultaneously where more than one cable is indicated in same raceway. Use UL listed and manufacturer approved pulling compound or lubricant where necessary. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values. Use dynamometer, capstan and two way communication to ensure this. Pulling shall not exceed 25 feet per minute. Never pull on middle of cable. Seal cable ends while pulling.
- B. Use pulling means including, fish tape, cable, rope, and basket weave wire/cable grips that will not damage cables or raceways. Do not use rope hitches for pulling attachment to cable.
- C. Do not install cable if ambient temperature is below -31°F. During cold weather installation, cable shall be pulled more slowly and trained in place the same day it is removed from storage. Do not impact, drop, kick or bend cable sharply in low temperatures.
- D. Feed cable into conduit using a guide tube or a conveyor sheave assembly. Use single sheaves for guiding cable only. Do not exceed bend radii while pulling over a sheave. Set up cable reels so that cable comes off reel with its natural curvature. Do no reverse bend cable.
- E. Install exposed cable parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- F. Bending Radii - Maintain 12X overall diameter or greater.
- G. Train cable to avoid dragging on edge of raceway.
- H. If using a basket grip, secure it in place with steel stripping and cut well behind the area it covers once the cable is in place.
- I. In manholes, handholes, and cable vaults, train cables around walls by the longest route from entry to exit and support cables at intervals adequate to prevent sag. However, redundant circuits shall be racked on opposite sides of the manhole or vault. Cables shall be secured with heavy duty cable ties to the cable rack arms. Provide additional cable racks where required.

3.4 INSTALLATION OF SPLICES AND TERMINATIONS

- A. Install splices at pull points and elsewhere using a standard kit. Conform to kit manufacturer's written instructions.
- B. Install terminations at ends of conductors using standard kits. Conform to manufacturer's written instructions. Comply with classes of terminations indicated.
- C. Tighten electrical connectors and terminals in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A-486B.
- D. When splicing and terminating medium voltage cable:
 - 1. Keep cable and work area clean and dry.
 - 2. Do not cut insulation.

3. Completely remove semi-conducting insulation shield, but do not lift it at cut-off point.
4. Keep non-shielded conductors away from ground and other phase conductors.
5. Ensure cable bends are smooth.
6. Use skirted terminators outdoors or in contaminated areas.
7. Use minimum amount of cleaning solvent.

3.5 INSTALLATION OF CABLE ACCESSORIES

- A. Arc-Proofing: Arc-proof medium-voltage cables individually in manholes and handholes. Apply as recommended by the manufacturer of the arc-proofing tape and the following:
1. Clean cable sheath.
 2. Apply arc-proofing tape in one half-lapped layer with the coated side toward the cable.
 3. Band the first and last applied wrap of the arc-proofing tape with two layers of 1-inch wide half-lapped, adhesive coated glass-cloth electrical tape.

3.6 GROUNDING

- A. Ground shields of shielded cable at terminations, splices, and separable insulated connectors. Ground metal bodies of terminators, splices, cable and separable insulated connector fittings, and hardware in accordance with manufacturer's written instructions. Use minimum of No. 4 AWG copper conductor and compression lugs.

3.7 IDENTIFICATION

- A. Identify cable in accordance with Division 26 Section "Identification for Electrical Systems." Identify voltage, feeder number and phase letter on each cable at each splice, termination and junction. Arrange identification so that it is unnecessary to move the cable or conductor to read the identification.

PART 4 - CONTRACTOR QUALITY CONTROL

4.1 FIELD QUALITY CONTROL

- A. General: Comply with applicable standards of The InterNational Electrical Testing Association (NETA) including Standard ATS, "Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems."
- B. Preparation: Perform the following preparations in advance of independent tests:
1. Test cables' insulation resistance.
 2. Test circuits' continuity.
 3. Furnish a set of Contract Documents and manufacturer's recommendations to test organization.
 4. Make power available at test locations.

- C. Schedule tests and notify COTR at least two weeks in advance of schedule for test commencement.
- D. Test procedure:
 - 1. Independent Testing Organization: Arrange and pay for the services of an independent electrical testing organization in accordance with the requirements of Division 01 Section "Quality Requirements" to perform tests on medium-voltage cable. The testing firm shall be regularly engaged in the testing of electrical equipment, devices, installations, and systems. The testing firm shall have at least five years of experience in the testing of electrical equipment of the type, rating, and voltage used on this Project. The testing firm shall be a current full-member company of the International Electrical Testing Association (<http://www.neta.org/>). This independent testing firm shall perform duties as required under the terms of this Contract.
 - 2. Test Objectives: To assure cable installation is operational within industry and manufacturer's tolerances, is installed in accordance with Contract Documents, and is suitable for energizing.
 - 3. Procedures: Comply with the INETA standard and IEEE 400. Upon satisfactory completion of tests, attach a label to tested components.
- E. Correct deficiencies and retest to demonstrate compliance.
- F. Reports: The testing organization shall maintain a written record of observations and tests, report defective materials and workmanship, and retest corrected defective items. Testing organization shall submit certified written reports to the COTR and Contractor, to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective actions taken to achieve compliance with requirements.
 - 4. Calibration records for the test instruments, meters and auxiliary equipment.

END OF SECTION 260513