SECTION 260513 - MEDIUM-VOLTAGE CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section includes cables and related cable splices, terminations, and accessories for medium-voltage electrical distribution systems.

B. Where a specific manufacturers name is listed an equal substitute may be used.

1.3 DEFINITIONS

A. Jacket: A continuous nonmetallic outer covering for conductors or cables.

B. NETA ATS: Acceptance Testing Specification.

C. Sheath: A continuous metallic covering for conductors or cables.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of cable. Include splices and terminations for cables and cable accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type of cable and accessory.

B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with IEEE C2 and NFPA 70.

C. Source Limitations: Obtain cables and accessories from single source from single manufacturer.

2.2 CABLES

A. Provide cables by one of the following:

1. Okonite
2. Marmon Utility / Kerite
3. Prysmian
4. Southwire
5. American Wire Group
6. Approved Equal

B. Cable Type: Type MV 105.

C. Conductor Insulation: Tree Resistant Crosslinked polyethylene (TR-XLPE) or Ethylene-propylene rubber (EPR).

1. Voltage Rating: 25 kV.
2. Insulation Thickness: 100% insulation level.

D. Conductor: 1/C #1/0 AWG Aluminum

E. Comply with UL 1072, AEIC CS8, ASTM B400 and ICEA S-94-649.

F. Conductor Stranding: Compressed round, Class B.

G. Strand Filling: Conductor interstices are filled with impermeable compound.

H. Shielding: Solid copper wires, helically applied over semiconducting insulation shield. Provide full neutral for #1/0 AWG cable.

I. Cable Jacket: Sunlight-resistant PVC or chlorinated polyethylene (CPE), or cross-linked polyethylene (XLPE), or low density polyethylene (LLDPE).

2.3 SEPARABLE INSULATED CONNECTORS

A. Description: Modular system, complying with IEEE 386, with disconnecting, single-pole, cable terminators and with matching, stationary, plug-in, dead-front terminals designed for cable voltage and for sealing against moisture.

B. See Drawings for Basis of Design.

C. Terminations at Distribution Points: Modular type, consisting of terminators installed on cables and modular, dead-front, terminal junctions for interconnecting cables.

D. Load-Break Cable Terminators: Elbow-type units with 200-A-load make/break and continuous-current rating; coordinated with insulation diameter, conductor size, and material of cable being terminated. Include test point on terminator body that is capacitance coupled.

E. Dead-Break Cable Terminators: Elbow-type unit with 600-A continuous-current rating; designed for de-energized disconnecting and connecting; coordinated with insulation diameter, conductor size, and material of cable being terminated. Include test point on terminator body that is capacitance coupled.

F. Dead-Front Terminal Junctions: Modular bracket-mounted groups of dead-front stationary terminals that mate and match with above cable terminators. Two-, three-, or four-terminal units as indicated, with fully rated, insulated, watertight conductor connection between terminals and complete with grounding lug, manufacturer's standard accessory stands, stainless-steel mounting brackets, and attaching hardware.

1. Protective Cap: Insulating, electrostatic-shielding, water-sealing cap with drain wire.
2. Portable Feed-Through Accessory: Two-terminal, dead-front junction arranged for removable mounting on accessory stand of stationary terminal junction.
3. Grounding Kit: Jumpered elbows, portable feed-through accessory units, protective caps, test rods suitable for concurrently grounding three phases of feeders and carrying case.
4. Standoff Insulator: Portable, single dead-front terminal for removable mounting on accessory stand of stationary terminal junction. Insulators suitable for fully insulated isolation of energized cable-elbow terminator.

G. Test-Point Fault Indicators: Applicable current-trip ratings and arranged for installation in test points of load-break separable connectors, and complete with self-resetting indicators capable of being installed with shotgun hot stick and tested with test tool.

H. Tool Set: Shotgun hot stick with energized terminal indicator, fault-indicator test tool, and carrying case.

2.4 SPLICE KITS

A. Description: For connecting medium voltage cables; type as recommended by cable or splicing kit manufacturer for the application.

B. See drawings for Basis of Design.

C. Standard: Comply with IEEE 404.

D. Splicing Products: As recommended, in writing, by splicing kit manufacturer for specific sizes, materials, ratings, and configurations of cable conductors. Include all components required for complete splice, with detailed instructions.

1. Premolded, EPDM splicing body kit with cable joint sealed by interference fit of mating parts and cable.

2.5 FAULT INDICATORS

A. Indicators: Automatically reset fault indicator with inrush restraint feature, arranged to clamp to cable sheath and provide a display after a fault has occurred in cable. Instrument shall not be affected by heat, moisture, and corrosive conditions and shall be recommended by manufacturer for installation conditions.

B. See drawings for Basis of Design.

2.6 SOURCE QUALITY CONTROL

A. Factory Test: Each length of cable shall be tested prior to shipment. The factory test shall consist of routine factory test. Four copies of certified test reports shall be submitted for record purposes.

B. Test and inspect cables according to ICEA S-94-649 before shipping.

C. Test strand-filled cables for water-penetration resistance according to ICEA T-31-610, using a test pressure of 5 psig.

D. Provide a copy of test reports to the Project Management Team (PM Team / Project Engineer).

2.7 PACKAGING

A. A compression style pulling eye shall be installed on the tail end of each cable reel.

B. Both ends of each cable end shall then be sealed with a heat-shrinkable cap.

C. Supplier/Vendor is responsible to test cable at the factory.

2.8 GUARANTEE

A. The power cable covered in these specifications shall be guaranteed to be free from defects in workmanship for the life of the installation. If within the guarantee period, the cable fails to meet the provisions of this guarantee, repairs or replacement of cable shall be made promptly at no additional expense or cost to the contract.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cables according to IEEE 576.

B. Proof conduits prior to conductor installation by passing a wire brush mandrel and then a rubber duct swab through the conduit. Separate the wire brush and the rubber swab by 48 to 72 inches on the pull rope.

1. Wire Brush Mandrel: Consists of a length of brush approximately the size of the conduit inner diameter with stiff steel bristles and an eye on each end for attaching the pull ropes. If an obstruction is felt, pull the brush back and forth repeatedly to break up the obstruction.
2. Rubber Duct Swab: Consists of a series of rubber discs approximately the size of the conduit inner diameter on a length of steel cable with an eye on each end for attaching the pull ropes. Pull the rubber duct swab through the duct to extract loose debris from the duct.

C. Pull Conductors: Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

1. Where necessary, use manufacturer-approved pulling compound or lubricant that does not deteriorate conductor or insulation.
2. Use pulling means, including fish tape, cable, rope, and basket-weave cable grips, that do not damage cables and raceways. Do not use rope hitches for pulling attachment to cable.
3. Use pull-in guides, cable feeders, and draw-in protectors as required to protect cables during installation.
4. Do not pull cables with ends unsealed. Seal cable ends with rubber tape.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

E. Install "buried-cable" warning tape 12 inches below grade.

F. In manholes, handholes, pull boxes, junction boxes, and cable vaults, train cables around walls by the longest route from entry to exit; support cables at intervals adequate to prevent sag.

G. Install sufficient cable length to remove cable ends under pulling grips. Remove length of conductor damaged during pulling.

H. Install cable splices at pull points and elsewhere as indicated; use standard kits.

I. Install terminations at ends of conductors, and seal multiconductor cable ends with standard kits.

J. Install separable insulated-connector components as follows:

1. Protective Cap: At each terminal junction, with one on each terminal to which no feeder is indicated to be connected.
2. Portable Feed-Through Accessory: At each terminal junction, with one on each terminal.
3. Standoff Insulator: At each terminal junction, with one on each terminal.

K. Install fault indicators on each phase where indicated.

L. 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.

M. Provide cable footage information on all cable reels.

3.2 FIELD QUALITY CONTROL

A. The qualified contractor, or qualified Testing Agency shall perform the following tests and inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters.
2. After installing medium-voltage cables and before electrical circuitry has been energized, test for compliance with requirements.
3. Perform VLF test of each new conductor according to NETA ATS, Ch. 7.3.3, and in accordance with Section 260800 "Electrical Inspection & Testing". Do not exceed cable manufacturer's recommended maximum test voltage. Note: Contractor may provide Hi-Pot testing in lieu of VLF testing for new cables.

B. \Medium-voltage cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 260513