

SECTION 26 05 13 – MEDIUM VOLTAGE CABLE

PART 1 - GENERAL

1.1 REFERENCES

- A. ANSI/IEEE C2 – National Electric Safety Code.
- B. IEEE 48 – Test Procedures and requirements for High Voltage Alternating Current Cable Terminations.
- C. NEMA WC8 – Ethylene Propylene Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
- D. ICEA S-68-516
- E. ASTM B-8, B-231
- F. AEIC CS-6
- G. UL 1072

1.2 SUBMITTALS

- A. Submit product data under the provisions of Division 26 "Basic Electrical Requirements."
- B. Submit product data indicating cable and accessory construction, materials, and ratings.
- C. Submit manufacturer's installation instructions.
- D. Submit manufacturer's certificate that medium voltage cable meets or exceeds specified requirements.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in medium voltage cable and accessories with minimum fifteen years documented experience.
- B. Cable: The medium voltage power cable shall have a performance record demonstrating a minimum of fifteen (15) years successful operating experience in utility and industrial cable applications.
- C. Installer: Company specializing in installation of medium voltage cable with minimum three years documented experience.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Accept cable and accessories on site in manufacturer's packages and inspect for damage.
- B. Protect cable and accessories from weather by covering with opaque plastic or canvas; provide ventilation to prevent condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Okonite Company.
- B. Southwire.
- C. Aetna Insulated Wire.
- D. Prysmian Cables.
- E. Kerite Company.

2.2 MEDIUM VOLTAGE CABLE (MV-105)

- A. Construction: Cable shall be Compact round, concentric lay, Class B aluminum, covered with an extruded layer of semiconducting ethylene-propylene elastomer. The insulation shall be an ethylene-propylene elastomer which shall meet or exceed the electrical and physical characteristics of ICEA S-68-516 and AEIC CS6 (latest edition). The insulation compound shall have a maximum ethylene content of 72 by weight and shall contain no polyethylene. The insulation screen shall be an extruded layer of semiconducting ethylene propylene-based material with a volume resistivity not in excess of 10 Ohm meters (at 90°C) and shall be applied in accordance with AEIC CS6. Both inner and outer semiconducting compounds shall have an elongation after air oven aging at 121°C for 168 hrs. of 100% and a brittleness temperature not warmer than -50°C. The semiconducting layers and insulation shall be applied using the triple tandem extrusion process. A 5-mil bare copper tape shall be applied over the outer semiconducting layer with a nominal 12.5% overlap. The outer jacket shall be a polyvinylchloride applied in accordance with ICEA S-68-516, Part 4.
- B. The cable shall be for use in aerial, direct burial; conduit, open tray and underground duct installations. The cables shall be capable of operating continuously at a conductor temperature not in excess of 105°C (MV-105) for normal operation, 130°C for emergency overload conditions, and 250°C for short circuit conditions. The cable shall be rated 15 kV 133% insulation level (220 mil insulation thickness).
- C. Cables shall be identified with manufacturer's name, conductor size, conductor material, voltage rating and insulation designation. This information shall appear on the cable covering at regular intervals.
- D. Production Tests
 - 1. Conductors shall meet the electrical resistance requirements of ICEA-68-516, Section 2.5.
 - 2. Insulation Resistance test shall be performed in accordance with the requirements of ICEA S-68-516, Part 6.28. Each cable shall have an insulation resistance not less than that corresponding to the insulation resistance constant of at least 50,000 megohms, 1000 ft. at 15.6C.
 - 3. A high voltage ac and dc test is performed in accordance with Part 6.27 of ICEA S-68-516 at the AC and DC test voltage given in Table II.
 - 4. Shield resistance is measured and recorded from end to end on the completed cable.
 - 5. Corona Test: Each reel of completed shielded power cable shall comply with the maximum partial discharge in picocoulombs. The partial discharge test shall be performed in accordance with the procedures of Section G of AEIC CS-6-82 AND X-Y recording graph will be furnished showing the corona test results.
 - 6. Certified and notarized production test reports, reel numbers for identification and date of manufacture and test shall be submitted for all cables.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that conduit trench is ready to receive work. Use mandrel to determine if installed conduit is suitable for use.
- B. Verify field measurements are as shown on Drawings.
- C. Beginning of installation means installer accepts existing conditions.

3.2 PREPARATION

- A. 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 inch (1200 to 1800 mm) 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.

3.3 INSTALLATION

- A. Install cable and terminations in accordance with manufacturer's instructions and to ANSI/IEEE C2.
- B. 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.
- C. Pull cables using suitable lubricants and cable pulling equipment. Do not exceed cable pulling tensions and bending radius recommended by manufacturer.
- D. Install cable in manholes along those walls providing the longest route and most spare cable lengths. Arrange cable to avoid interferences with duct entrances into manhole.
- E. Avoid abrasion and other damage to cables during installation.
- F. Arc and Fireproof all new cables in manholes and in pull boxes using fireproofing tape extended one inch (25 mm) into ducts. Arc and fireproofing shall consist of 3M Company, Scotch #77, 3" wide, electric arc and fireproofing tape wrapped with a 1/2" width overlap, the entire exposed length of the cable. Arc proofing tape shall be held in place with 3M Company, Scotch #69, 3/4" wide, glass cloth electrical tape applied in a spiral of three (3) turns per 12" of cable run.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 26 "Medium Voltage Cable/Termination Testing."

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- B. Inspect exposed cable sections for physical damage. Verify that cable is connected according to Drawings and that shield grounding, cable support, and terminations are properly installed.
- C. All new cables shall be connected to ensure that the phasing sequence is maintained.

END OF SECTION 26 05 13