

SECTION 260513 – MEDIUM-VOLTAGE CABLES

PART 1 - GENERAL

In general MSU personnel will purchase, install, and terminate medium-voltage cable from outside the building up to and on the incoming line switches.

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. This Section specifies the medium-voltage cable for buildings and structures.
 - 2. Provide all labor, materials, and equipment as necessary to complete all work as indicated on the drawings, and as specified herein.

Note information to be shown on the drawing.

- 3. Furnish and install medium-voltage cable complete with splices and terminations as shown on the drawing.

- B. Related Sections include the following:

- 1. Applicable sections of Division 26 - Electrical

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Medium-voltage cables
 - 2. Splice kits
 - 3. Terminations

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70, "National Electrical Code"
- C. The medium-voltage cable shall conform to the following unless modified in this specification:
 - 1. ANSI
 - 2. ASTM
 - 3. NEMA
 - 4. ICEA

PART 2 - PRODUCTS

2.1 CABLE CONSTRUCTION

- A. High voltage cable shall be 2/0 AWG, 350 KCMIL, or 500 KCMIL, size(s) as noted on the drawing, 1/C, copper power cable, 15 KV ungrounded (133% insulation level) suitable for normal installation, indoors or outdoors, in conduit or underground ducts, intermittent or continuous submersion in water and direct burial.
- B. The cable shall be comprised of uncoated soft or annealed copper conductors made up of concentric-lay Class B round stranding in accordance with the current requirements of ASTM standards.
- C. Extruded over each conductor shall be a non-conducting energy suppression layer at a minimum thickness per ICEA. The layer shall be tested during manufacture at a minimum 1 KV DC between electrodes and conductor to prove its electrical integrity.
- D. Extruded over the stress control layer shall be the primary insulation at a thickness of 220 mils. The insulation shall be a high quality ozone and discharge resistant, High Temperature Kerite, ethylene-propylene-rubber compound containing no more than a maximum of 55% ethylene. The entire insulation system shall be suitable for normal use at 90 degrees Centigrade continuous conductor temperature, 130 degree C. for emergency overload conditions, and 250 degree C. for short circuit operation.
- E. Over the insulation shall be an extruded non-metallic semi-conducting shield of black thermoplastic having a thickness as follows:

Diameter Over Insulation (Inches)	Shield Thickness (Mils)
Up to 1.000	30
1.001 to 1.500	40
1.501 and larger	50

- F. Over the semi-conducting shield, a concentric strand shall of 17-#12 copper wires shall be applied.
- G. Over the shield apply a 50 mil polyethylene jacket.

2.2 THREE CONDUCTOR CABLE ASSEMBLY

- A. Three single conductor cables of equal length shall have the overall jacket continuously marked as follows: first cable - manufacturers name, manufacturing date, A, red band; second cable - same as first except B, blue band; third cable - same as first except C, black band.
- B. The three single conductor cables shall be wound parallel on the shipping reel.
- C. Cable ends shall be sealed to prevent the ingress of water and other contaminants.

2.3 PRODUCTION CABLE TESTING

- A. Each length of cable provided will be tested in accordance with the following tests.
- B. The complete cable, while on the shipping reel, shall be tested at room temperature at a minimum of 44 KV AC for five minutes.
- C. The conductor resistance and shield continuity shall be measured on each shipping length of cable and recorded. Each end of every shipping length shall also be inspected for water in strands and checked dimensionally for conformance with the above standards.

2.4 DISCHARGE RESISTANCE TESTING

- A. The cable supplier shall submit to the purchaser, at the time of the proposal, a Certified Test Report showing that the proposed insulation system is unaffected by electrical discharge when tested in accordance with the procedures specified in ICEA S-19-81 (latest edition) except that the test potential shall be a minimum of 250 volts per mil of nominal insulation system thickness and the test duration a minimum of 1,000 hours.

- B. The test shall be made on #2 (7) AWG copper or aluminum conductor insulated with an 18 mil stress control layer over the conductor and 175 mils of thermosetting rubber based compound (insulation as specified above), over the stress control layer.

2.5 MANUFACTURER

- A. Cable shall be manufactured by Kerite.

2.6 CABLE TERMINATIONS

- A. Cable terminations on overhead lines and in switchgear shall be outdoor type, Class 1 terminations. Terminations shall be Raychem HVT-150-SJ series or 3M 7640-T series.

2.7 CABLE SPLICING

- A. In-line splices for cable shall be Raychem HVS-1510SJ series.
- B. Wye splices for cable shall be Raychem HVSY-1520SC series.
- C. Trifurcating transition splices for splicing 3/C PILC to 1/C solid dielectric cable shall be Raychem HVS-T-1580S series.

2.8 LIVE END SEALS

- A. Live end seals for cable shall be Raychem HVES-1520D series.

PART 3 - EXECUTION

3.1 CABLE INSTALLATION

- A. All duct in which cable is to be installed shall be fished and thoroughly cleaned using a mandrel or swab to remove any dirt, concrete, or other debris in the duct.
- B. Pulling compound shall be Albentonite, Polywater, or other material as recommended by the cable manufacturer for polyethylene or neoprene jacketed cable.
- C. Cables shall be installed the long way around each manhole.
- D. All cable exposed in manholes, vaults, buildings, etc. shall be supported from cable brackets using porcelain or maple insulating blocks under cable at each bracket.

3.2 FIRE PROOFING

- A. All new primary cable, where exposed in vaults, manholes, and buildings, shall be covered with 3M Scotch 77 arc and fire proofing tape 2 inches wide. Apply two layers of tape, half lapped and wound in opposite directions.

3.3 TAGGING OF CABLES

- A. Cables shall be tagged in all manholes at each conduit and in buildings at entry points.
- B. Tags shall be made of polypropylene, injection molded characters integral with locking grids. Color additives and U.V. stabilizers shall be molded throughout the tags. Both the background and the characters have a minimum thickness of 0.040”.
- C. Tags shall be horizontal orientation with a polyethylene tag holder. Tag holder shall have a 0.060” thickness punched with six slots for mounting.
- D. Tags shall be 1” high character Everlast by Tech Products, Inc. (800-221-1311).
- E. Information on tags shall be as noted and shown on drawing. Tags shall be approved by Engineering Services Department prior to installation.

END OF SECTION 260513