SECTION 26 05 19 – MEDIUM VOLTAGE CABLE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY:
A. This section details general requirements for medium-voltage cable and accessories.
B. Related Sections:
   1. Section 01701 - Building Systems Identification and Labeling
   2. Section 26 00 10 – Electrical Design Criteria

1.2 QUALITY ASSURANCE:
A. The Engineer of Record is responsible for designing the medium-voltage cable and distribution system in accordance with applicable portions of NFPA 70 Codes and per good engineering practices.
B. 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.

1.3 MEDIUM-VOLTAGE DISTRIBUTION SYSTEM DESIGN REQUIREMENTS:
A. General details for configuration of the campus 11 KV and 4.16 KV distribution systems are noted in Section 26 00 10 - Electrical Design Criteria.
B. Medium-Voltage cable wiring methods:
   1. Minimize routing of medium-voltage distribution circuits within occupied portions of buildings. Where such circuits are run through a building, install within galvanized, rigid steel conduit, painted orange and labeled for the circuit voltage contained within them.
   2. Within dedicated building electrical service rooms and vaults: galvanized rigid steel conduit or wireways. Exposed cable is not acceptable.
   4. Above ground: galvanized, rigid steel conduit, painted orange and labeled for the circuit voltage contained within them.
   5. Within dedicated high voltage electric rooms and substations, where not subject to mechanical damage: EMT conduit, galvanized rigid steel conduit or in cable tray.

1.4 MEDIUM-VOLTAGE CABLE – 5KV and 15KV CLASS:
A. Single conductor, insulated, shielded and jacketed cables. Cable shall be listed for and suitable for use in wet or dry locations, sunlight resistant, including cable tray and conduit use.
B. For 11 KV systems, cable shall be 15 KV, class MV-105, 133% insulation rating.
C. For 4.16 KV systems, cable shall be rated 5 KV, class MV-105, 133% insulation rating.
D. Cable shall be copper conductor, compact strand, or compressed round or standard round as required.
E. Insulation: EPR ethylene propylene rubber.

F. Shielding: Cable construction to include conductor shield and a semi-conducting, thermosetting-type insulation shield. Insulation shield to include a helically-wrapped, outer copper-tape shield.

G. Outer Jacket: PVC jacket.

1.5 TERMINATORS:

A. In switchgear and transformers with live-front bushings:
   1. Elastimold 35MSC series;
   2. 3M QT-3 tubular series;
   3. RAYCHEM TFT-R cold-shrink kits.

B. Dead-front switchgear and transformers or junctions:
   1. 600 amp 5 and 15 KV: Elastimold 656LR series elbow kit with ground adapter and IEEE386 capacitive test points.
   2. 200 amp 5 and 15 KV: Elastimold 166LR series elbow kit with ground adapter and IEEE386 capacitive test points.
   3. Fused 5 KV class elbows: Elastimold 166FLR series elbow kit with fuse and (2) IEEE386 capacitive test points.

C. End sealing caps:
   1. Raychem ESC
   2. 3M EC series

D. Surge Arrestors:
   1. MOV, Elastimold BSA elbow/bushing type.

1.6 SPLICES:

A. 600-Amp:
   1. Elastimold premolded “T” assembly, series 655LR with shield grounding device, sized for the cable.

B. 200-Amp:
   1. Elastimold premolded straight assembly, series 151SP or pre-molded “T” assembly, series 150T, sized for the cable.

1.7 JUNCTIONS:

A. 600-Amp dead-break, minimum 4 points or as required:
   1. Cooper “Multipoint”
   2. Elastimold 650J

B. Cap unused points with insulated caps and bails.

1.8 FAULT DETECTORS/INDICATORS:

A. Field-programmable size per cable ampacity rating.

B. Provide with remote-located optical indicator when detector is located within manholes or other enclosures.

C. Cooper Power systems “SCVTAR” or Schweitzer “SEL BTRIP”.
1.9 FIREPROOFING:
   A. Cables within manholes shall be wrapped in fire-proofing tape.

1.10 LABELING and CABLE IDENTIFICATION:
   A. All Medium-voltage circuits shall be identified with cable tags. Coordinate with Brown FM Engineering for cable designations for new circuits.
   B. For modifications to existing cable circuits, provide new cable tags for entire route of existing circuit.
   C. Brown requirements for high voltage cable tags are as follows:
      1. Plastic 10-mil plastic heat-laminated typewritten paper tags, double-sided, with brass grommet, and tie-wrapped to each cable. Tags shall include the following information:
         2. Cable section identification
         3. Location of cable tag (ie., manhole number)
         4. Cable size, type and voltage rating
         5. Cable origin (switchgear and switch number)
         6. Cable destination (switchgear and switch number, or Building and disconnect switch location)
         7. Date of installation
         8. 11 KV cable tags are to be colored orange, 4.16 KV cable tags are to be colored blue.
   D. Provide tags at each cable entry into and leaving manholes and pullboxes, at each switchgear or other equipment cable termination and, where installed, for each set of paralleled feeders (print two copies of this document for tags).

PART 2 - PRODUCTS

2.1 CABLE
   A. Manufacturers:
      1. Okonite
      2. Pirelli
      3. General Cable

PART 3 - EXECUTION

3.1 EXISTING WORK:
   A. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.
   B. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.
   C. Clean and repair existing wire and cable remaining or is wire and cable to be reinstalled.

3.2 CABLE INSTALLATION – GENERAL:
   A. Clean underground ducts and conduits prior to pulling in cables.
B. Handle and protect cable to avoid entrance of moisture. During installation, immediately seal cable ends with sealing caps after cutting.

C. Cable Pulling:
   1. Arrange pulling equipment to minimize side loads on duct banks and enclosures, and maximize the bending radius of the cables.
   2. Maintain a minimum bending radius of 10 times the cable diameter.
   3. Do not exceed manufacturer’s recommended cable pulling tension. Monitor and record cable pulling tensions during installation.

D. Install cables within manholes, handholes and vaults with a full loop to allow for future splices and extensions. Support cables and splices on suitable saddles and supports, with maximum 36” spacing.

E. Identify each wire and cable circuit as indicated.

F. Fireproof medium voltage cables in manholes.

3.3 TERMINATIONS and SPLICES:

A. Cable splicers shall be certified and trained in proper splicing and termination techniques.

B. Keep splices and terminations free of water, dirt, and other contaminants.

C. Ground cable shields to the system grounding conductor at each termination and splice.

D. Install junctions in manholes with proper bails to adequately support the junction and cable terminations.

E. Shielding and cable grounding conductors shall be continued through splices.

F. Effective ground connections shall be provided for all cable sheaths and shielding grounds at each splice or termination. Grounding conductors shall be grounded to the grounding bus in switchgear, power switching centers and similar locations.

G. Splices, when allowed, shall only be installed in handholes or manholes.

3.4 IDENTIFICATION:

A. Identify each wire and cable circuit as noted in paragraph 1.10.

B. Identify cable phases with colored tape at terminals, splices and boxes. Colors are as follows:
   1. Phase conductors: Black, blue, and red.
   2. Ground: green
   3. Neutral: white

3.5 TESTING:

A. All feeders shall be acceptance tested after the cable is installed, including all splices and terminations, but before final equipment connections are made.

END OF SECTION