SECTION 26 05 13

MEDIUM VOLTAGE CABLES AND TERMINATIONS

PART 1 - DESIGN DIRECTIVES

1.1 SECTION DESCRIPTION

A. Campus medium voltage cable and terminations. Greater than 1000 V.

1.2 CAMPUS MEDIUM VOLTAGE DISTRIBUTION SYSTEM DESCRIPTION

A. See Section 26 10 00 - Medium-Voltage Electrical Distribution and Feeder Entrance.

1.3 DESIGN CRITERIA

A. Dartmouth FOM-Engineering and Utilities' Approved Medium-Voltage Electrical Engineer shall perform the following.:

1. Design campus medium-voltage electrical distribution up to the building Medium Voltage (MV) entrance feeder and equipment.

B. Dartmouth College FOM Electric Shop shall perform the following.

1. Specify medium voltage splice, elbow and termination materials for each location such as manholes, and at switchgears.
2. Perform all splices and terminations.

    a. May be performed by an approved contractor.

1.4 CAMPUS MEDIUM VOLTAGE DISTRIBUTION SYSTEM FEEDER CABLES

A. In Conduit/Ductbank, or in Cable Tray Not Accessible to Unqualified Persons:

1. 4160 V Systems:

    a. Three 15 kV, #350 kcmil cables plus one 600V insulated #4/0 XHHW neutral conductor per feeder enabling future use at the higher voltage.

        1) 5/8 kV cable will be allowed with permission of FOM-Engineering & Utilities.

2. 13.2 kV Systems:

    a. Three 15 kV, # 350 kcmil cables plus one 600V insulated #4/0 XHHW neutral conductor per feeder.

B. In Cable Tray Accessible to Unqualified Persons or As Directed by FOM Engineering & Utilities:

1. Type CLX:

    a. Three 5 kV or 15 kV, # 350 kcmil cables plus one 600 V insulated #4/0 neutral conductor per feeder.

C. For Feeders from a Fused Switch to a Building Transformer:

1. For 4160 V System:

    a. Three 15 kV, #2/0 kcmil cables plus one 600 V insulated XHHW #4/0 neutral conductor per feeder.

        1) 5/8 kV cable will be allowed with permission of FOM-Engineering & Utilities.

2. For 13.2 kV System:

    a. Three 15 kV, # 2/0 kcmil cables plus one 600 V insulated XHHW #4/0 neutral conductor per feeder.

D. Cables in Accessible Locations such as Manholes and Cable Trays: Wrap with fireproofing tape.

E. Junction Points: Wall mounted in manholes for loadbreak and deadbreak elbow connections.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Dartmouth College FOM Electric Shop:

1. Will specify all medium voltage splice, elbow and termination materials for each location such as manholes and switchgears. Part Numbers: Subject to change.
2. Product shall be used from Dartmouth College stock with stock replenishment from new product supplied with project.

2.2 APPROVED MANUFACTURERS

A. Cables: Okonite; Keywright

B. Terminations: 3M, Richards, Cooper Power Series.

C. Junction Points: Elastimold

D. Load Break Elbows: Elastimold, 3M and Richards

E. Splices: 3M, Richards, Cooper Power Series.

F. Grounding Materials: Burndy

G. Fireproofing Wrap Tape: 3M and Scotch

2.3 MATERIALS

A. Cables: Okonite Okogaurd MV-105 EPR 115 mil with Copper Tape Shield:

1. 5/8 kV: 350 kcmil. Okoguard-Okoseal Type MV-105, EPR insulation. Cat #114-23-3837
2. 15 kV: 350 kcmil. Okoguard-Okoseal Type MV-105, EPR insulation. Cat #115-23-3127
3. 15 kV: #2/0. Okoguard-Okoseal Type MV-105, EPR insulation. Cat #115-23-3117

B. CLX Cable:

1. 15 kV: #350 kcmil. Okogaurd Power Cable-Aluminum Sheath C-L-X, Type MV-105, EPR insulation, Cat. #571-23-3536

C. Fireproofing Tape: Scotch No. 77 or approved equal

D. Junction Points:

1. Elastimold 600 Series Deadbreak. Cat. #K650J2; 2-point
2. Elastimold 600 Series Deadbreak. Cat. #K650J3; 3-point

E. Butt Splices, Terminations:

1. 5 kV Systems:

a. Butt Splices: 3M Cold Shrink Splice Kits.

1) 3M #5551 (#6 to 4/0)
2) 3M #5552 (4/0 to 500 kcmil)
3) 3M #5553 (500 to 1000 kcmil)

b. Terminations: 3M Cold Shrink Termination Kits

1) 3M #7622-T-110 (4/0 to 400 kcmil)
2) 3M #7624-T-110 (50 to 750 kcmil)

2. 15 kV Systems:

a. Butt Splices: Raychem or Richards Splice Kits.

1) Raychem #HVS-1521S (#2 to 4/0)
2) Raychem #HVS-1522S (250 to 350 kcmil)

b. Terminations: Raychem or Richards Splice Kits

1) Raychem #HVT-151-G (4 to 1/0)
2) Raychem #HVT-152-G (2/0 to 350 kcmil)

F. Grounding Materials:

1. Crimp Connectors: Burndy or other approved equal.

a. #4/0 to 4/0. Burndy #YGHC29C29
b. #4/0 to #4. Burndy #YGHC29C26
c. #4 to #4. Burndy #YGHC2C2

G. Loadbreak Elbows:

1. 5 kV Load break Elbows: Elastmold or Richards product.

a. 200 Amp: Elastimold #166LR-WX
b. 600 Amp: Elastimold #K655LR-W0X. #20MA grounding kits

2. 15 kV Deadbreak Elbows:

a. 600 Amp: Elastimold Cat. # K656BLR
b. Cold Shrinkable Seal with Braid Grounding Kits: Elastimold or Richards.

1) Elastimold Cat. #200ESG3 for 350 kcmil cable.

3. Test Points: Provided at all loadbreak elbows.

H. Fault Indicators: On cables at switchgear terminations.

1. Remote Indicating: Provide where fault indicators are located in enclosed switchgear.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Medium Voltage Splicing:

1. College Electricians: Will perform medium voltage splicing and terminations (4.16 &13.2 KV systems) unless decided otherwise by Dartmouth College.

a. Dartmouth College: Reserves right to decide what firms perform medium voltage splicing on a case-by-case basis.

1) Contractor: Must provide for College review, evidence of their staff qualifications.

B. Medium Voltage Termination and Splice Materials:

1. Submitted and approved by Dartmouth College FOM - Engineering and Electric Shop.

a. Dartmouth College FOM: Will provide a detailed list of required termination and splice materials for project.

C. College Electricians:

1. Are the only workers allowed to operate equipment on the medium voltage system.
2. Will make the final connections to utility system and energize medium voltage feeders supplying new and remodeled facilities on campus.
3. Approval to Energize New Equipment in Completed Installation:

a. Contingent on approval by Dartmouth College FOM-Engineering and the Town of Hanover Zoning Office.
b. See Electrical Energizing Requirements in Section 26 21 00 Medium-Voltage Electrical Distribution and Feeder Entrance.

3.2 TERMINATION OF DE-ENERGIZED CABLES RETAINED FOR FUTURE USE (ONLY WITH DARTMOUTH FO&M APPROVAL)

A. Dry, Environmentally Controlled Locations: Such as utility tunnel or buildings.

1. Individual Cables De-Energized and Left for Future Use:

a. Sealed with a heat shrink cap.

2. CLX Cable Assemblies:

B. Terminated with a breakout boot, sealing the armor.

a. Individual Cable Ends: Sealed with a heat shrink cap.

C. Environmentally Uncontrolled Locations: Such as manholes and handholes.

1. Individual Cables:

   a. Terminated with a deadbreak elbow and mounted to parking bushings.

2. CLX Cable Assemblies:

   a. Terminated with a breakout boot, sealing the armor
   b. Individual Cable Ends: Terminated with deadbreak elbows and mounted to parking bushings.

END OF SECTION