SECTION 16122D - MEDIUM VOLTAGE CABLE (ABOVE 600 VOLTS)

A. MATERIAL: Copper conductors of 98% conductivity shall be used, unless use is restricted by Government agencies.

B. PRIMARY VOLTAGE CABLE: Cable construction and installation raceways shall be specified in detail. Primary voltage shall be as follows:

1. 12.47KV Service: 1/c - 15KV-EPR shielded cable and PVC overall jacket. Minimum size of cable shall be 4/0. Jacket shall have surface ink printing indicating manufacturer, cable size, insulation type, and voltage rating. Each cable shall have extruded semi-conducting polymeric layer covered with helically-applied copper tape insulation shield. Copper shield shall have overlay. Insulation level shall be 133% ethylene-propylene rubber (EPR); conductor wire shall be copper. Lead cable is not acceptable.

2. 4160 volt service - 1/c - 5KV - EPR shielded cable and PVC overall jacket. Jacket shall have surface ink printing indicating manufacturer, cable size, insulation type and voltage rating. Each cable shall have extruded semi-conducting polymeric layer, covered with helically-applied copper tape insulation shield. Copper tape shall have overlay. Each cable shall have ethylene-propylene-rubber (EPR), 133% insulation level. Conductor wire shall be copper. Lead cable is not acceptable.

3. Cable Installation Details
   a. Cable pulling tension shall not exceed the smallest of following values: 1. Allowable tension on conductor as published by the manufacturer. 2. Allowable tension on pulling devices. 3. Allowable sidewall tension.
   b. Cable pulling attachment must be to the conductor only and devices should be staggered to prevent over tensioning of pulling device.
   c. Cable continuity and phase identification shall be checked and tagged, using 1 inch x 3 inch plastic tags. In manholes cables shall be identified with wording issued by the University Project Manager, and have tags installed where cables enter and leave the manhole. Phase positions at terminating equipment shall be Phase “A” “B” “C” left to right facing the front, or “A” “B” “C” front to back, “A” “B” “C” top to bottom. Phasing must be confirmed before placing cable system into operation.
   d. Flame Proofing: Cables in manholes, vaults, etc., shall be flame-proofed with pressure sensitive applied flame-proof tape.
   e. Primary Voltage Cables shall have over current protection at point where cable receives its supply (may not apply to loop distribution with pad mounted switches). Feeder run size reduction must be coordinated in regard to appropriate cable damage curves. In general,
feeder run size reduction is prohibited unless approved by the University Project Manager.
f. Cable entering a building and/or run inside the building shall be installed in rigid galvanized steel conduit or UL approved equipment.

4. Cable joints and termination.

a. Cable joints and termination must be same rating as conductors. Provide fully shielded joints for each phase conductor.
b. In underground structures (e.g., manholes), provide watertight fully submersible joints and termination’s. Under no circumstances shall cable joints be installed in raceways.
c. In general, compression type connector approved for the terminating device is the only acceptable method. “T” splicing is not allowed under any circumstance.
d. Cable Splicers: Before any cable splicer starts to work, submit to the University Project Manager the names of the cable splicers with proof that each splicer has 3 years or more experience in splicing and terminating cables for type and rating to be used. The Project Manager may require each splicer to make dummy joint and termination in accordance with manufacturer’s instruction. In addition, the Project Manager may submit dummy joint or termination to an approved Cable Testing Contractor, who is member of NETA for evaluation before work can proceed.
e. Cable Terminating Kit. Ray-Chem is only acceptable kit for terminating any medium voltage cables. Any deviation will have to be approved by the University Project Manager.

5. Testing of Medium Voltage Terminations

a. All primary distribution voltage cables shall be given a D.C. high potential test prior to all permanent connections being made.
b. Cable continuity and phase identification must be checked. Cables shall not be subjected to more than one high potential test without approvals of the University Project Manager. Successive test shall be at voltages per instruction from the University Project Manager.
c. The D.C. Potential test voltage to be applied shall be 80% of manufacturer’s acceptance test voltage level, applied in incremental steps and for such duration as specified by the University Project Manager until the 80% value is reached; then 80% value must be held for fifteen minutes. The test voltage should be applied gradually during first minute with initial application being not greater than the rated voltage of the cable.
d. During high potential tests, leakage current readings shall be taken at thirty (30) second intervals during the first two minutes of the test and at one (1) minute intervals during remainder of test. If, after first
minute, the leakage current increases, the University Project Manager may elect to stop the test. Further tests will be made at his/her discretion only. No test will be accepted while there is continual increase in leakage current throughout the test. The cable must withstand the specified high voltage test without breakdown.

e. Where cable is being spliced or joined to old cable system, test must be approved by the University Architect before testing is performed. The condition of old cable shall be determined. New cable shall be tested before connecting.

f. Test record shall include the following:

1. Complete identification of cable, including approximate length.
2. High potential value, leakage current value, and time data.
3. The approximate average cable temperature and humidity.
4. High potential versus leakage current plot.

g. Cable shall not be energized until these tests and phasing are confirmed and approval is given by the University Project Manager.

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