

SECTION 26 05 13 - MEDIUM-VOLTAGE CABLES

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

- A. Provide complete wire and cable system to meet the requirements of the project.
- B. Provide wire size in accordance with NEC.

PART 2 - PRODUCTS

2.1 MEDIUM VOLTAGE CABLES

- A. Provide single copper conductor shielded power cable insulated with ethylene propylene rubber (EPR) rated for 133% insulation level, insulation thickness at 220 mils. The cable shall have a continuous temperature rating of 90°C, an emergency overload temperature rating of 130°C, and a short-circuit temperature rating of 250°C. The cable shall be suitable for operation in wet or dry locations and for installation in duct or conduit. The cable shall be listed as Type MV-90, 15KV XLP-PVC and shall carry a UL label.
- B. Insulation shield shall be semi-conducting extruded, semi-conducting EPR, and uncoated copper tape. Shield ampacity shall be equivalent to one overlapped 5 mil copper tape (with a 12.5% (mini-overlap)). Jacket thickness shall not be less than 80 mils, of black polyvinyl chlorides.
- C. Termination shall be Class 1 or Class 2; of the molded elastomer, wet-process porcelain, pre-stretched elastomer, cold shrink elastomer, or taped type. Class 3 terminations are not acceptable.
- D. Separable insulated connectors may be used for apparatus terminations, when such apparatus is provided with suitable bushings. Connectors shall be of suitable construction for the application and type of cable connected, and shall include cable shield adapters.

PART 3 - EXECUTION

3.1 WIRE

- A. Install all above grade medium voltage cable in rigid metallic conduit unless noted otherwise.
- B. A wire pulling lubricant must be used when pulling conductors through conduit or duct runs over 10 feet in length. The pulling compound shall be compatible with the raceway, conductor and jacket material.
- C. Cable splices and joints shall be allowed only in pull boxes. Notify facilities management prior to splicing cables. Identify all splices and pull box locations on as-built drawings.
- D. Ground conductors shall be installed in the same duct with their associated phase conductors.
- E. Wires shall be pulled in using pulling eyes securely attached to the conductor. Pulling grips which transmit the pulling tension directly to the jacket or insulation shall not be permitted.

3.2 JOINTS AND SPLICES

- A. Joints and splices shall be performed based on the manufacturers' written instructions.

- B. Shields shall be applied as required to continue the shielding system through each entire cable joint. Shield may be integrally molded parts of preformed joints. Shields shall be grounded at each joint.

3.3 TERMINATIONS

- A. Terminations shall be of the type required for equipment termination, and shall be performed based on the manufacturer's written instructions.
- B. Terminations, where required, shall be provided with mounting brackets suitable for the intended installation and with grounding provisions for the cable shielding.

3.4 FIELD QUALITY CONTROL

- A. Inspect exposed cable sections for damage after cable is pulled.
 - 1. Material: Contractor shall provide all necessary testing equipment and devices required to perform the tests described in this Section.
- B. Perform DC high potential tests per manufacture recommendations.
- C. Perform shield continuity tests. Investigate resistance values in excess at 10 ohms per 1000 ft.

3.5 EXECUTION

- A. Insulation Resistance (Megger) Testing
 - 1. This procedure will provide the necessary guidelines to ensure an acceptable insulation resistance test.
 - a. This procedure is applicable to Megger testing only.
 - b. Megger testing shall be done during both construction and start-up.
 - c. This procedure applies to the following equipment:
 - 1) Medium Voltage Switchgear.
 - 2) Medium Voltage Cable.
 - 2. In all cases, the manufacturer's instructions shall be consulted and integrated into this test guideline to assure full compliance and acceptance without jeopardizing equipment warranties.
 - 3. Test Preparation:
 - a. Verify that proper Megger apparatus of the correct voltage is available.
 - b. Equipment to be tested shall be clean and dry.
 - c. All equipment shall be tested before being initially energized. All necessary precautions shall be taken to prevent the equipment from becoming energized during the test.
 - d. Except as required for testing, all construction related to the equipment shall be finished.
 - e. Ensure equipment frame grounds are complete.
 - 4. Test Procedure:
 - a. Voltage shall be applied as quickly as possible.
 - b. After each test, the equipment shall be adequately grounded to remove any residual charge.
 - c. Equipment shall be tested both phase to phase and phase to ground where applicable.
 - d. Medium voltage 15KV cables shall be tested twice.
 - 1) After pulling but before termination, all cables shall be tested just prior to termination to determine if any damage occurred during pulling.
 - 2) After termination, medium voltage cables shall be tested just prior to being energized, as part of the system including the intended load.
 - 5. Test Acceptance:
 - a. The tests shall be considered satisfactory on the equipment being tested if all recorded readings meet the manufacturers' acceptance criteria.

3.6 DIRECT CURRENT OVERPOTENTIAL TEST

- A. This test procedure will provide the necessary guidelines to accomplish an acceptable insulation overpotential test.
 - 1. This procedure is applicable to cable rated for 5KV and larger.
 - 2. Test prior to permanent termination and energizing..

- B. In all cases the manufacturer's instructions shall be consulted and integrated into this procedure to assure compliance and acceptance without jeopardizing equipment warranties.

- C. Preparation:
 - 1. Take necessary steps to insure that equipment will not become energized during the test.
 - 2. Appropriate D.C. hi-pot equipment is available and the user has 3 years experience testing medium voltage cable and equipment.
 - 3. The equipment to be tested has successfully passed an insulation resistance test (Megger) immediately prior to this test.

- D. Testing – Step Method
 - 1. Apply test voltage in 7 equal increments recording leakage at each step and stabilize.
 - 2. Hold maximum test voltage for 10 minutes.

END OF SECTION 26 05 13