

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

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. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 STANDARDS AND CODES

- A. Methods of installation shall comply with the provisions of applicable Sections of NEC, Article 300.
- B. Materials shall be in accordance with NEC, Article 310 and shall be UL listed for application intended.

1.4 DESCRIPTION

- A. This Section describes the basic materials and methods of installation for general wiring systems of 600 volts, and for communication wiring.
- B. Minimum size conductors shall be No. 14 AWG for 15 amp branch circuits, No. 12 AWG for 20 amp branch circuits, No. 14 AWG for control wiring and 20 AWG shielded for communication and sensor wiring.

1.5 QUALIFICATIONS

- A. The material used for the wiring systems shall be the products of a manufacturer regularly engaged in the manufacturing of the specified material. Where a manufacturer is named for a particular material, the material of other manufacturers will be acceptable provided the material meets requirements of the Specifications.

1.6 SUBMITTALS

- A. Submit product data for each type of wire and cable. Identify for which application listed below its use is intended.

PART 2 - PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Wire and cable for power shall have copper conductors of not less than 98% conductivity and shall be insulated to 600V (except as noted below).
- B. Type of wire and cable for the various applications shall be as follows:
 - 1. Type XHHW (75°C wet location) aluminum conductors. Use for service entrance.
 - 2. Type THWN or XHHW (75°C): Use for branch circuits, and equipment power feeders in wet and dry locations, No. 12 AWG minimum.
 - 3. Type THHN or XHHW (90°C): Use for branch circuits, and equipment power feeders in dry locations only, No. 12 AWG minimum.
 - 4. Non-Metallic (NM-B) Sheathed Cable: Multiple single THHN conductors protected by an outer jacket of PVC. The conductor insulation shall be PVC and rated for 600 Volts. The solid or stranded conductors shall be made of annealed copper and rated for 90°C in dry locations. Type NM cable may be used for exposed and concealed branch circuit wiring and equipment feeders in dry locations. Where exposed, the cable shall not be subject to physical damage. Suitable for use in one and two family dwellings. And in Multi-family dwellings of Type III, IV and V construction (except as prohibited in NEC 334.12).
 - 5. Type "SE/SER" aluminum cable may be used for feeders to residential unit panels.
 - 6. All aluminum conductors shall be compact stranded type and utilize anti-oxidant compound for terminations.
- C. Conductor color coding shall be as follows:
 - 1. Wiring systems shall be color coded. Conductor insulation shall be colored in sizes up through No. 6 AWG, conductors No. 4 AWG and larger shall have black insulation and shall be phase color coded with one-half inch band of colored tape at all junctions and terminations. Colors shall be assigned to each conductor as described below and carried throughout all main and branch circuit distribution.

120/240-Volt

- a. Phase 'A' conductor – Black

- b. Phase 'B' conductor – Red
 - c. Neutral conductor – White
 - d. Grounding conductor – Green
- D. Connectors shall be as follows:
 - 1. In-line splices and taps for conductor sizes No. 8 AWG and smaller; use 3M Co. "Scotchloc" vinyl insulated spring connectors, or equivalent.
 - 2. Insulate splices and taps to thickness of conductor insulation with half-lapped of 3M "Scotch" brand No. 33 vinyl electrical tape. Connectors having irregular surfaces; fill voids and smooth contours with 3M "Scotchfil" electrical putty prior to tapping.
 - 3. Splices are not allowed in service conductors or feeders without the prior written approval of the Engineer, Owner and local Utility Co.

2.2 IDENTIFYING AND SUPPORTING OF WIRE AND CABLES

- A. Feeder Identification Tags:
 - 1. Plastic identification tags or pressure-sensitive labels designed for fastening to cables, feeders and power circuits in pull boxes, electrical equipment rooms and at terminations of cable or wire.
 - 2. Stamped or printed tags or labels to correspond with indicated markings, or mark so that feeder or cable may be readily identified.
 - 3. If suspended type tags are provided, tie tags with slip-free plastic cable lacing unit or by nylon bundling straps.
 - 4. Other identification tags as called for on plans and in other sections of these specifications.
- B. Conductor Bundling Straps:
 - 1. Formed from self-extinguishing nylon.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Conduit shall be swabbed free of moisture and debris prior to pulling in wire.

3.2 INSTALLATION

- A. General:
 - 1. Provide ample slack wire for motor loops, service connections and extensions.
 - 2. Do not bend cables during installation, either permanently or temporarily, to radii less than manufacturer's recommended minimum radius, or 12 times the outer diameter, whichever is larger, except for the 600V insulated cables where conditions make the specified radius impractical and shorter radii are permitted by the NEC and NEMA Standard WC7, Appendix H.
 - 3. Neatly and securely bundle cable conductors located in branch circuit panelboards, cabinets, control boards, and switchboards. Use nylon bundling straps.

B. Wire Pulling:

1. Provide suitable installation equipment to prevent cutting and abrasion of conduit and wire during the pulling of feeders.
2. Use masking or other means of prevent obliteration of cable identifications when solid color coating or colored tracers are used.
3. Pull together cables to be installed in a single conduit.
4. Do not exceed manufacturer's recommended maximum pulling tension.
 - a. On cables 1/0 and larger use a pulling basket.

END OF SECTION 260519