

**SECTION 16120**  
**WIRING SYSTEMS**

**PART 1 - GENERAL**

**1.01 DESCRIPTION OF WORK**

- A. Install all conductors as required for the proper operation of the various systems specified. All connections shall be made complete, and all systems shall be energized and tested for proper operation.

**1.02 QUALITY ASSURANCE**

- A. Wire manufactured over one year prior to delivery to the site will not be accepted.
- B. Tapes for splices or termination shall be dated by the tape manufacturer to indicate that they have been manufactured no longer than six months prior to use in the Work of this Section.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Conductors shall be delivered at the building in original packages or on reels, and shall have the tag of the manufacturer attached thereto indicating: Contractor's name, Project title and number, Date of manufacturing.
- B. Store material in a clean, dry space and protect from weather.

**1.04 SUPPLEMENTAL SUBMITTALS**

- A. Submit a Product Schedule indicating the item description and manufacturer name. The Schedule will be accepted by the Authority for record purposes only, provided that the items are in full compliance with the Specifications.
- B. Certificates

Provide affidavit stating that all items used are UL listed and meet the specifications.

- C. Submit field test results for wires and cables, including "Megger" readings with the method used.

## **PART 2 - PRODUCTS**

### **2.01 WIRES AND CABLES**

#### A. General

1. Conductors shall conform to A.S.T.M. and I.P.C.E.A. standards, and be UL listed and labeled.
2. Conductors shall have 600 volt rated insulation and shall be of soft-annealed-uncoated copper of 98% conductivity. Copper clad conductors are not acceptable.
3. All conductors shall have identifiable lettering on the insulator jacket as to voltage rating, wire type, A.W.G. size, insulation, and manufacturer I.D.

#### B. Wire Description

1. Type THHN/THWN: 75°C, THHN: 90°C shall have a thermo-plastic polyvinyl chloride insulation with nylon jacket for 600 volts, and shall comply with ASTM, IPCEA S-61-402 (latest edition) and NEMA WC5 (latest edition).
2. TFFN (stranded) shall be thermoplastic insulated, jacketed by abrasion and oil resistant nylon, rated at 105°C.
3. Metal Clad Cable (Type MC) shall be a factory assembly of conductors, each insulated and enclosed in a metallic flexible interlocking metal tape armor of galvanized steel or aluminum. A bare internal grounding conductor shall be included and insulated from the outer metal armor. All conductors, including grounding conductor, shall be a minimum of #12 AWG. The assembly shall be UL listed and rated at 600V, 90°C.

**2.02 SPLICES AND TERMINATIONS**

## A. General

1. All materials for making splices and terminations shall be specifically designed for use with the type of wire, the cable insulation, the installation and the operating conditions of the specific application and be UL listed.
2. Grounding conductors and bonding jumpers shall be connected by exothermic welding, listed pressure connectors, listed clamps, or other listed means.

**2.03 MISCELLANEOUS EQUIPMENT: NOT USED****PART 3 - EXECUTION****3.01 PREPARATION**

- A. Prior to pulling wires and cable, clean raceway systems of all foreign matter and perform all operations necessary so as not to cause damage to wires and cables while pulling.

**3.02 INSTALLATION**

## A. General

1. At least 6 inches of free conductor, measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at each outlet, junction and switch point for splices or the connection of luminaries or devices. Where the opening of an outlet, junction or switch point is less than 8 inches in any dimension, each conductor shall be long enough to extend at least 3 inches outside the opening
2. Use approved lubrication when installing cables in conduits and raceways. Any pulling compounds shall be compatible with the finish of the wires and cables furnished.

- B. Type THHN/THWN wire

1. Feeder and Branch Circuits
  2. Remote-Control Signaling and Power-Limited Circuits: - Circuit Classes 1, 2 or 3, unless otherwise indicated.
- C. Type MC Cable - Use in concealed installation of hung ceiling and gypsum board for:
1. Lighting Branch circuit.
  2. Power branch circuit.
- D. Lighting Fixture Wires
1. For wiring within lighting fixtures only, where sizes #12 AWG or smaller is required, use Type TFFN.
- E. Identifications of Wires and Cables
1. Each wire and cable shall be identified by its circuit in all cabinets, boxes, manholes, handholes, wire ways and other enclosures and access locations, and at all terminal points.
- F. Terminations
1. For Conductor Sizes Larger Than Terminal Capacity On Equipment: Reduce the larger conductor to the maximum conductor size that terminal can accommodate (reduce section no longer than 1 ft.). Cutting of cable strands to fit terminal is not acceptable.

### **3.03 COMMON NEUTRAL CONDUCTOR**

- A. A common neutral may be used for 2 or 3 branch circuits where the circuits are indicated on the Drawings to be enclosed within the same raceway, provided each branch circuit is connected to different phase busses in the panelboard.
- B. Exceptions - The following circuits shall have a separate neutral:

1. Circuits containing ground fault circuit interrupter devices.
  - a. Circuits containing solid state dimmers.
  - b. Circuits for computers, peripherals and related equipment.
  - c. Circuits recommended by equipment manufacturers to have separate neutrals.

### **3.04 EQUIPMENT GROUNDING CONDUCTOR**

Note that equipment-grounding conductors are not shown on the Contract Drawings but it shall be provided when and as required by code.

### **3.05 ELEVATOR WIRING: NOT USED**

### **3.06 BRANCH CIRCUIT WIRING**

#### **A. Multiwire Branch Circuits:**

1. Disconnect Means: Each multiwire branch circuit shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point where the branch circuit originates
2. Grouping: The grounded and ungrounded conductors of each multiwire branch circuit shall be grouped by wire ties or similar means in at least one location within the panelboard or other point of origination as per NEC 2008, Article 210.4.

### **3.07 HOSPITAL GRADE WIRING: NOT USED**

### **3.08 FIELD TESTS**

- #### **A. Test all feeder cables installed under this Contract with a 1000-volt Megohmmeter. Furnish the Authority's Representative with a copy of the "Megger" test report, together with an outline of the method used. Any cable not attaining the minimum reading established in the code shall be replaced.**

**END OF SECTION**

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Schedule	_____	_____
Certificates	_____	_____
Field test report	_____	_____

\* \* \*