

**PART 1 GENERAL****1.01 DESCRIPTION**

- A. Provide all conductors, cables, connectors, lugs, cable ties, and terminations for all systems.

**1.02 QUALITY ASSURANCE**

- A. All conductors shall be Underwriters Laboratories, Inc., listed and comply with Fed. Spec. J-C-30B and UL 83. Materials omitted here but necessary to complete the work are to be of comparable quality.

**1.03 PRODUCT DELIVERY, STORAGE & HANDLING**

- A. Deliver conductors and cables in complete coils with UL label and bearing manufacturer's name, wire size, and type of insulation.
- B. Store and handle materials so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.
- C. Deliver conductors No. 10 and smaller in manufacturer's original unopened and undamaged cartons with labels legible and intact.

**1.04 SUBMITTAL AND RECORD DOCUMENTATION**

- A. None required.

**PART 2 PRODUCTS****2.01 CONDUCTORS**

- A. Conductors No. 10 AWG and smaller may be soft-drawn, stranded, or solid copper. Conductors larger than No. 10 AWG shall be stranded, soft-drawn copper.
- B. Insulation for new conductors installed in raceways shall be "THWN" for conductors No. 8 AWG or smaller, and "THWN" or "THHN" for conductors No. 6 AWG or larger, or as noted.
- C. Where adverse conductor exposure exists, code-approved insulation suitable for the conditions encountered shall be used unless shown otherwise on the Drawings.
- D. All wire and cable for feeder circuits shall conform to the latest requirements of the current edition of the NEC and shall meet all ASTM Specifications. Wire and cable shall be new and have wire size, grade of insulation, voltage, and manufacturer's name permanently marked on outer covering at regular intervals.
- E. Sizes shall not be less than indicated. Branch circuit conductors shall not be smaller than No. 12 AWG. Class I remote control and signal circuit conductors shall not be less than No. 14 AWG. Class 2 low energy remote control and signal circuit conductors shall not be less than No. 18 AWG.
- F. All insulation shall be rated 600 volts unless noted otherwise.

- G. Acceptable Manufacturers: General Electric, Hatfield, Anaconda, Rome Cable, Essex, Belden, West Penn, or approved.

## 2.02 SPLICES AND TERMINATIONS

- A. All connectors shall be solderless pressure type per Fed. Spec. W-S-610, properly taped. All taped joints shall be with plastic tape, "Scotch 33," applied in half-lap layers without stretching to deform.
- B. Splices shall utilize Scotch "Hyflex" or "Ideal" wing nut connector installed properly. Splices for No. 8 and larger wires shall be made with tin or silver plated copper compression sleeves.
- C. Splices made in handholes and manholes, or underground splices, shall be made water tight with epoxy resin-type splicing kits.

## PART 3 EXECUTION

### 3.01 CONDUCTORS

- A. Insulation shall be removed with a stripping tool designated specifically for that purpose. All conductors shall be left nick-free.
- B. UL listed pulling compounds may be used with the residue cleaned from the conductors and raceway entrances after the pull is made.
- C. Raceway shall be complete, clean and free of burrs before pulling conductors.
- D. Wire shall not be left extending out of exposed conduit stubs or incomplete raceways where subject to mechanical injury.
- E. Pulleys or blocks shall be used for alignment of the conductors when pulling. Pulling shall be in accordance with manufacturer's specifications regarding tensions, bending radii of the cable and compounds.
- F. Conductors shall be terminated as required.
- G. Conductor sizes for special systems shall be as recommended by the equipment manufacturer except as noted.
- H. Stranded conductors shall not be terminated with post and screw unless compression spade/ring lug is utilized.
- I. 120-volt homeruns over 80 feet in length shall be minimum #10 conductor.

### 3.02 LABELING

- A. Provide color coding of building wiring consistent throughout the work as listed herein, unless required otherwise by local code authority. Band feeder conductors not available in colors where clearly visible at each termination, tape or splice using two full wraps of 3/4" adhesive vinyl tape or equally visible color marking corresponding to the following table.

Less than 250V between phases

Phase A - Black  
Phase B - Red  
Phase C - Blue

251 to 600V btwn phases

Phase A - Brown  
Phase B - Orange  
Phase C - Yellow

Neutral - White  
Ground - Green

Neutral - Gray  
Ground - Green

- B. Switch legs, travelers, etc., to be consistent with the above phases to which they are connected or may be any other color distinctive from those listed above. Complex control circuits may utilize any combination of colors but the identification shall be by labels throughout. Labeling shall be accomplished by using computer-generated heat shrink labels suitable for the wire size used. In no case will hand lettering or wraparound labels be accepted.
- C. Phase color code to be consistent at all feeder terminations, A-B-C left to right or A-B-C top to bottom.
- D. Conductor identification shall be provided within each enclosure where a tap, splice, or termination is made.
- E. Control circuit terminals of equipment shall be properly identified. Terminal and conductor identification shall match that shown on approved shop drawings. Hand lettering or marking is not acceptable.

### **3.03 SPLICES AND TERMINATIONS**

- A. Splices are to be made up completely promptly after wire installation. Single wire pigtails shall be provided for fixture and device connections. Wire nuts may be used for fixture wire connections to single wire circuit conductor pigtails.

### **3.04 CONNECTORS**

- A. Control and special systems wires shall be terminated with a tool- applied, spade-flared lug when terminating at a screw connection.
- B. All screw and bolt-type connectors shall be made up tight and be retightened after an eight-hour period.
- C. All tool-applied compression connectors shall be applied per manufacturer's recommendations and physically checked for tightness.
- D. Check terminations in all panelboards, switchgear, motor control centers, etc., six months after completion of installation. Supply a confirming letter to the Owner at completion of test.

### **3.05 TESTS**

- A. Perform insulation resistance tests on all feeders and circuits over 100 A, 480 volt and below, with a 1,000 volt megger. The written test report listing the results of the test to be included in the Operating and Maintenance Manuals. Equipment which may be damaged by this test shall be disconnected prior to the test.

**END OF SECTION**