

SECTION 16123

WIRE AND CABLE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Building wire and cable.
- B. Underground feeder and branch circuit cable.
- C. Service entrance cable
- D. Metal clad cable.
- E. Wiring connectors and connections.

1.02 RELATED SECTIONS

- A. Section 16010: Basic Electrical Requirements.

1.03 DESIGN REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70. (N.E.C.)
- B. Furnish products listed and classified by Underwriters' Laboratories, Inc. as suitable for purpose specified and shown.
- C. All conductor sizes shown are based on copper.
- D. Manufacturer's name, wire size and insulation type shall be clearly marked on the insulation or jacket.

1.04 SUBMITTALS

- A. Submit Shop Drawings, Owner's Manuals, and Operating Instructions in accordance with Section 01300 - Submittals.
- B. Include MC manufacturer's specification sheets indicating construction, diameter, ampacity and bending radius.

1.05 PROJECT CONDITIONS

- A. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet project conditions.
- B. Where wire and cable routing is not shown, and destination or circuit number only is indicated, determine exact routing and lengths required.

1.06 COORDINATION

- A. Locate such that outlets are readily accessible.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. American Insulated Wire Corp.
- B. Carol Cable.
- C. The Okonite Co.
- D. Paranite Essex Group.
- E. Pirelli.
- F. Triangle PWC, Inc.
- G. Or approved equal

2.02 WIRE AND CABLE

- A. Description: Single conductor insulated wire.
- B. Conductors: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70 (N.E.C.), Type THHN/THWN, XHHW, rated 90 degrees C.

2.03 METAL CLAD CABLE

- A. Description: ANSI/NFPA 70 (N.E.C.), Type MC with separate insulated ground.
- B. Conductor: Copper, maximum # 10 AWG.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 90°C.
- E. Armor Material: Aluminum.
- F. Armor Design: Interlocked metal tape or Corrugated tube.
- G. Jacket: None.

2.04 WIRING CONNECTORS

- A. Use The Following Types As Herein Specified:
 - 1. Split bolt connectors.
 - 2. Solderless pressure connectors.
 - 3. Spring wire connectors.
 - 4. Compression connectors.
 - 5. Insulation piercing connectors.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.02 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.03 WIRING METHODS

- A. Concealed Dry Interior Locations: Use only wire Type THHN/THWN, XHHW insulation, in raceway or metal clad cable.
- B. Accessible Dry Interior Locations (such as above acoustical ceilings): Use only wire Type THHN/THWN, XHHW insulation, in raceway or metal clad cable.
- C. Exposed Dry Interior Locations:
 - 1. Use exposed wiring only where specifically indicated.
 - 2. Use only wire Type THHN/THWN, XHHW insulation, in raceway or metal clad cable.
- D. Wet or Damp Interior Locations: Use only building wire Type THWN, XHHW, XHHW-2 insulation, in raceway.
- E. Exterior Locations: Use only building wire Type THWN, XHHW, XHHW-2 insulation, in raceway .
- F. Underground Installations: Use only building wire Type XHHW or XHHW-2 insulation, USE cross-linked polyethylene, designed for direct burial but installed in raceway except as indicated on the Drawings.
- G. Panel and Transformer Feeders: Use only building wire Type XHHW and XHHW-2 insulation, in raceway.
- H. Use other wiring methods only as specifically indicated on Drawings.

3.04 INSTALLATION

- A. Install products in accordance with manufacturers instructions.
- B. Except as otherwise specifically noted, all wiring throughout the building, including each of the systems specified, shall be enclosed in raceways.
- C. In general, all wire in raceways and cable shall be concealed above ceilings and within finished walls, securely supported in accordance with code requirements. Wiring in areas with no finished ceilings (exposed construction) shall be raceways exposed overhead such that all raceways are parallel or perpendicular to joists, columns or beams and concealed in walls.
- D. Use solid conductor for feeders and branch circuits #10 AWG and smaller. At contractors option stranded conductors for #10 AWG and smaller shall be permitted as long as vinyl insulated support crimp-on fork terminals are use for all screw head terminations. Barrel lugs and screw activated compression clamps on back wired devices shall not require crimp-on terminals.
- E. Use stranded conductor for feeders and branch circuits #8 AWG and larger.

- F. Use stranded conductors for control circuits.
- G. Minimum Size Conductors for Power and Lighting Circuits #12 AWG Except as Follows:
 1. Minimum #10 AWG for 120 volt circuits more than 100 feet long.
 2. Sizes shall be not less than indicated.
 3. Note: Wire sizes indicated on drawings and schedules are minimum requirements and shall be adjusted to meet the above criteria.
- H. Use conductor not smaller than #16 AWG for control circuits with fusing sized accordingly.
- I. Pull all conductors into raceway at same time.
- J. Use suitable wire pulling lubricant for building wire #4 AWG and larger.
- K. Support cables above accessible ceiling, using spring metal clips or approved cable ties to support cables from structure. Do not support from ceiling suspension system. Do not rest cable on ceiling panels. Do not draped over ductwork or between bar joists. Wiring shall not be run diagonally and shall be cabled neatly.
- L. Use approved cable fittings and connectors.
- M. Neatly train and lace wiring inside boxes, equipment, cable trays, and panelboards.
- N. Clean conductor surfaces before installing lugs and connectors.
- O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- P. Use split bolt connectors, insulation piercing connectors or U.L. approved insulated connectors for copper conductor splices and taps, #6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- Q. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, #8 AWG and smaller.
- R. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- S. Wiring in sleeves passing through fire-rated barriers shall be sealed/filled with approved material to maintain the fire rating.

3.05 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 16195.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.06 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.

- B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- C. Verify continuity of each branch circuit conductor.
- D. Verify proper operation of each circuit.

END OF SECTION