SECTION 260523 -BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Contractor Provide:

1. Building wire and cable as shown on drawings or specified including feeders, branch circuit power, lighting systems and other systems specified.
2. Wiring connectors and connections.

1.2 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years experience.

1.4 SUBMITTALS

A. Submit shop drawings and product data.

B. Indicate material specifications, dimensions, capacities and color coding.

C. Provide product data for all wire and cable.

D. Submit manufacturers' installation instructions.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.6 REFERENCES

A. If conflict between referenced standards and contract documents, notify Architect/Engineer immediately. Do not proceed with the work until the Architect/Engineer issues instructions.

B. National Electrical Manufacturers Association (NEMA):

1. WC 3 - Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
2. WC 5 - Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
3. WC 7 - Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

C. National Fire Protection Association (NFPA): NFPA 70- National Electrical Code.

D. Underwriters laboratories, Inc. (UL): Listed and labeled materials.

E. Manufacturers' Catalogs: Specified manufacturers' catalogs are incorporated by reference to same force and effect as if repeated herein full.

1.7 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Conductors shall be copper.

C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 COORDINATION

A. Determine required separation between cable and other work.

B. Determine cable routing to avoid interference with other work.

PART 2 - PRODUCTS

2.1 BUILDING WIRE AND CABLE

A. Thermoplastic insulated building wire: NEMA WC 5, UL-83 ICEA S-61-402 or S-66-524.

B. Metal Clad Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with insulated ground wire. Conductors shall be THHN/THWN copper stranded enclosed in an overall armor of smooth (tube) metallic sheath, corrugated metallic sheath, and interlocking metal tape armor. Armor can be either galvanized steel or solid aluminum. **Aluminum interlocked sheathing is not acceptable. MC cable may only be installed if allowed by local code.**

C. Feeders larger than 250 MCM: Copper, stranded conductor, 600volt insulation THHN/THWN.

D. Feeders and branch circuits larger than 8 AWG and smaller than 250 MCM: Copper, stranded conductor, 600volt insulation THHN/THWN.

E. Feeders and branch circuits 8 AWG and smaller: Copper conductor, 600volt insulation THHN/THWN, solid or stranded conductor.

F. Control Circuits: Copper, stranded conductor, 600volt insulation TFFN, THW, or THHN/THWN.

G. Low voltage wire for lighting controls: #14 plenum rated. 3 conductor cable, or as specified by lighting controls manufacturer.

H. Color code conductors as specified in Section 260553 - Electrical Identification.

2.2 JOINTS AND SPLICES

A. Make terminations, taps and splices with an indent type pressure connector with insulating cover for 8 AWG and smaller.

B. Instead of indent type connectors insulated spring compression connectors may be used for 10 AWG and smaller.

C. Use mechanical compression or bolted type connector for 6 AWG or larger. Cover connector with insulating type or heat shrinkable insulation equivalent to 150% conductor insulation.

2.3 WIRE PULLING LUBRICANT

A. Pulling lubricant shall be a UL listed, water-based, polymer solution. Lubricants containing waxes or soaps are not acceptable.

B. The lubricant shall be compatible with the cable insulation and shall not cause any premature deterioration of the insulating material. When used on high voltage cable, the lubricant shall not affect the volume resistance of any semi-conducting jacket or insulation shield present.

C. Dried residue from lubricant shall not become tacky or gum-up. Cables shall remain able to pull after lubricant has dried.

D. The lubricant shall be as approved by the cable manufacturer for use with their cables.

E. Acceptable Manufacturers/Products:

1. American Colloid/Poly-X.
2. American Polywater/Polywater J.
3. ARNCO/Hydra-Lube.
4. Buchanan/Quick Slip.
5. Condux/Super-Lube.
6. Ideal/Aqua-Gel.

PART 3 - EXECUTION

3.1 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.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

A. Concealed Dry Interior Locations: Use building wire, in raceway or metal clad cable.

Provide building wire in raceway for all homeruns. Homeruns begin within 15 feet of first device served by the branch circuit.

B. Exposed Dry Interior Locations: Use only building wire, in raceway.

C. Above Accessible Ceilings: Use building wire, in raceway or metal clad cable. Provide building wire in raceway for al homeruns.

D. Wet or Damp Interior Locations: Use only building wire, in raceway.

E. Exterior Locations: Use only building wire, in raceway.

F. Underground Installations: Use only building wire, in raceway.

G. Low voltage wire shall be installed in conduit in non accessible locations and where exposed. Plenum rated cable can be installed above accessible ceilings supported at 5 foot intervals or 1 foot from transition.

3.4 INSTALLATION

A. Install products in accordance with manufacturers' instructions.

B. Use conductor not smaller than 12 AWG for power and lighting circuits.

C. Use conductor not smaller than 14 AWG for control circuits.

D. Use 10 AWG conductors for 20 ampere, 120volt branch circuits longer than 75 feet.

E. Use 10 AWG conductors for 20 ampere, 277volt branch circuits longer than 200 feet.

F. Pull all conductors into raceway at same time.

G. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

H. Protect exposed cable from damage.

I. Use suitable cable fittings and connectors.

J. Neatly train and lace wiring inside boxes, equipment, and panelboards.

K. Clean conductor surfaces before installing lugs and connectors.

L. Make splices, taps and terminations to carry full ampacity of conductors with no perceivable temperature rise.

M. Place an equal number of conductors for each phase of a circuit in same raceway or cable.

N. Splice only in accessible junction, outlet boxes, cable tray or surface metal raceway.

O. Make conductors equal lengths for parallel circuits.

P. Branch circuits shall not share neutral conductors.

Q. Provide dedicated neutral conductor for each circuit from the Dimmer Equipment.

R. MC cable shall not run exposed in finished spaces.

S. MC cable shall not be used for home runs to/from panelboards. A home run begins within 15 feet of first device or fixture in a branch circuit.

3.5 IDENTIFICATION

A. Identify wire and cable under provisions of Section 260553.

B. Identify each conductor with its circuit number or other designation.

3.6 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.

END OF SECTION 260523