SECTION 16120
WIRE AND CABLE

PART 1 GENERAL

1.01 SUMMARY
A. Section Includes:
   1. Building wire.
   2. Remote control and signal cable.
   3. Wiring connections and terminations.
   4. Modular wiring systems.
B. Related Sections:
   1. Section 16110 - Raceways

1.02 REFERENCES
A. Specify Underwriters Laboratories (UL) listed equipment, assemblies and materials.
B. Where appropriate, refer to current NEMA Standards for material ratings.

PART 2 PRODUCTS

2.01 BUILDING WIRE
A. Thermoplastic - Insulated Wire:
   1. Types THW, THHN, THWN; rating 600V.
B. Rubber - Insulated Building Wire:
   1. Types RH, RHW, RHH, XHHW; rating 600V.
C. Conducted Material:
   1. Conductors #10 AWG and larger, stranded copper.
   2. Conductors smaller than #10 AWG, solid copper.
D. Control Wire:
   1. Stranded copper with 600V insulation.

2.02 REMOTE CONTROL AND SIGNAL CABLE
A. Class 1, 2, or 3:
   1. Copper conductor, 300V insulation, rated 60°C, covered with PVC jacket.
2. All control and signal cables shall be in conduit.

2.03 MODULAR WIRING SYSTEMS

A. Not allowed.

2.04 TERMINATION

A. Splices and taps are to carry full ampacity of conductors without perceptible temperature rise.

PART 3 EXECUTION

3.01 GENERAL WIRING METHODS

A. Device removal - in multi-wire branch circuit - where a circuit extends through a receptacle, it shall be a requirement that all conductors shall be pigtailed so downstream load does not go through receptacles.

B. Where harmonic currents exist on circuits supplying electric discharge lighting, data processing or similar equipment, a full sized neutral shall be provided for each single phase circuit, and an oversized neutral may be required for each multi-wire circuit.

C. Wire Sizing:

1. Minimum wire size of #12 AWG for power and lighting circuits.

2. Minimum wire size #14 AWG for control circuits.

3. For 20 ampere 120V circuits longer than 75’, specify #10 AWG conductors.

4. For 20 ampere 277V circuits longer than 150’, specify #10 AWG conductors.

5. For circuit amperes other than 20 ampere and for distances greater than listed above, calculate voltage drop and size conductors for maximum 3% voltage drop.

D. Wire Color Coding:

1. Color code wires for building voltage classes as follows:

<table>
<thead>
<tr>
<th>120/208V-3Ø</th>
<th>277/480V-3Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>ØA - Black</td>
<td>ØA - Brown</td>
</tr>
<tr>
<td>ØB - Red</td>
<td>ØB - Orange</td>
</tr>
<tr>
<td>ØC - Blue</td>
<td>ØC - Yellow</td>
</tr>
<tr>
<td>Neutral - White</td>
<td>Neutral - Gray</td>
</tr>
<tr>
<td>Ground - Green</td>
<td>Ground - Green</td>
</tr>
</tbody>
</table>

E. Parallel Conductors:

1. Specify that parallel conductor feeders be installed so that all runs are of identical equal length.

F. Insulation Ratings:

1. All conductors shall be specified 600V rated.

2. Insulation types specified shall conform to NEC requirements for temperature, moisture, and mechanical environmental conditions.
3.02 WIRING INSTALLATION IN RACEWAYS

A. Wire Pulling:
   1. Require all conductors to be pulled into conduit at the same time.
   2. Specify UL listed wire pulling lubricant.
   3. Require conduits to be swabbed clean before wire is pulled in.

B. Length of conductors at receptacles, junction, and switches at least 6” of free conductor shall be left at each outlet, junction and switches for splices or connection of fixtures or devices.

3.03 CABLE INSTALLATION

A. Cable Protection:
   1. Provide protection for cables where subject to mechanical damage.

3.04 WIRING CONNECTIONS AND TERMINATIONS

A. General Requirements:
   1. Specify that conductors may be spliced only in accessible junction boxes or wireways.
   2. Require that wires be thoroughly cleaned before installing lugs or connectors.
   3. Specify a grounding conductor(s) in all branch circuit raceways.

3.05 QUALITY CONTROL

A. Feeders:
   1. Require continuity and insulation (meggar) resistance testing of all feeders. Minimum four (4) meg.

END OF SECTION