

SECTION 16060

INSTALLATION OF WIRE AND CABLE

PART 1 - GENERAL

1.1 GENERAL

- A. The Provisions of Section 16010 General Requirements for Electrical Work apply to the Work of this Section.

1.2 CODES AND STANDARDS

- A. Products shall comply with the following codes and standards and shall be UL-listed and labeled where applicable.

IEEE 48 Standard Test Procedures and Requirements for High Voltage Alternating Current Cable Terminations.

IEEE 404 Standard for Cable Joints for use with Extruded Dielectric Cable Rated 5000V through 46000V.

UL 486A Wire Connectors and Soldering Lugs for use with Copper Conductors.

UL 510 Electrical Insulating Tape

1.3 SUBMITTALS

- A. Manufacturers product data sheets

PART 2 - PRODUCTS

2.1 WIRE AND CABLE

- A. Wire and cable are specified in other Sections of Division 16000.

2.2 TERMINATIONS AND SPLICES

- A. Power Wiring:

1. Terminal lugs, connectors and splices shall be tin plated, high conductivity copper compression type. They shall have chamfered barrels and be permanently identified with conductor sizes.
2. Terminal lugs for conductors No. 3/0 AWG and larger shall be long barrel NEMA two hole type.
3. Splices shall be long barrel butt type with a center stop in the splice barrel.
4. Hydraulic crimping tools with proper die sizes which require full closure before reopening shall be used.

- B. Lighting and branch circuits
 - 1. Splices and taps in lighting and branch circuit wiring shall be 3M Hyflex connectors or equal.
- C. Metal clad cable connectors.
 - 1. For non-jacketed metal clad cable in dry locations, cable terminations shall be O.Z. Gedney Type PK for use with galvanized steel armor or Type PK-A for use with aluminum armor. Cable terminations shall be provided with locknuts and bushings.
 - 2. For jacketed metal clad cable, cable terminators shall be Thomas & Betts "SPIN-ON".

PART 3 - EXECUTION

3.1 GENERAL

- A. Conductors shall be carefully handled during installation to avoid damage of any kind. They shall be unreeled or uncoiled slowly in order to prevent damage to the insulation or sheath due to sudden bending. Repeated bending shall be avoided. Sharp kinks shall be avoided in unreeling, uncoiling and pulling.
- B. Suitable precautions shall be made to protect all installed wiring against damage due to construction activities.

3.2 PREPARATION OF RACEWAYS

- A. Raceways shall be substantially completed before any wiring is installed in them. Before any wiring is pulled into a conduit, the conduit shall be cleaned and tested for obstructions and cleared of foreign material that may be found.

3.3 PULLING INTO RACEWAYS

- A. All possible care shall be taken in pulling of wiring into conduits or other raceways. The cable reels or coils shall be set up in such a way that the conductor may be trained into the raceway as directly as possible with a minimum number of changes of direction or amount of bending. Where several cables are contained in one conduit, all such cables shall be pulled in together.
- B. The use of pulling lubricants shall be restricted to non hardening type, approved by UL and the cable manufacturer.
- C. Maximum allowable pull tension as specified by the cable manufacturer shall not be exceeded. Cables shall not be bent or pulled around sheaves less than the minimum radius recommended by the manufacturer.

3.4 SPLICES AND TERMINATIONS

- A. All power and control wiring shall be continuous and shall not be spliced unless otherwise indicated on the Drawings.

- B. Bolts, nuts and hardware used for terminations shall be silicone bronze. All terminations shall be properly torqued and provided with Belleville washers.
- C. Where terminations are made on insulated buses, the terminations shall be insulated using the proper tape(s) and fillers for the voltage level of the cable.
- D. Shielded medium voltage cable shall be provided with stress relieved terminations in accordance with IEEE 48, Class 1. Terminations shall be made from kits containing all necessary materials as manufactured by Raychem or equal and installed in accordance with the manufacturer's instructions.
- E. Splices in shielded medium voltage cable shall comply with IEEE 404 and be made from kits containing all necessary materials as manufactured by Raychem or equal and installed in accordance with the manufacturer's instructions.
- F. Connections in motor terminal boxes shall be made by installing compression type lugs on the motor branch circuit conductors and the motor leads and bolting the lugs together then insulating with motor lead connection kits, Raychem, 3M or equal.
- G. Control wiring terminated on terminal blocks provided with saddle clamps does not require terminal lugs. Where screw or stud type terminal blocks are provided, control wiring shall be terminated with insulated, crimp type locking forks, Thomas & Betts STA-KON or approved equal.

3.5 IDENTIFICATION

- A. All power wiring conductors shall be color coded as follows:

<u>Phase</u>	<u>208Y/120V</u>	<u>480Y/277V</u>
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green

- B. Each cable shall be permanently identified with cable numbers as indicated on the Drawings. Tags shall be provided at each end, in manholes, pull and splice boxes.
- C. Each control conductor shall be identified with a preprinted, sleeve type wire marker. The wire numbers shall match those shown on the Drawings or on manufacturer's schematic and connection diagrams.

3.6 TESTING

- A. Wire and cable shall be tested in accordance with Section 16200 "600 V Wiring."

END OF SECTION 16060