SECTION 16120

WIRES AND CABLES

PART 1 – GENERAL

1.01 WORK INCLUDED

A. WIRES AND CABLES.

1.02 SUBMITTALS

A. SUBMIT product information.

PART 2 – PRODUCTS

2.01 WIRE AND CABLE MANUFACTURERS

A. Cablec
B. Okonite
C. Southwire
D. Or equal, approved by the Architect.

2.02 GENERAL

A. WIRING: 98 percent conductivity copper, unless noted otherwise on Drawings. No aluminum conductors will be permitted.

B. BRANCH CIRCUITS: Flame retardant, moisture resistant, thermoplastic, Type Letter THWN & THHN, 60 degrees C maximum operating temperature, rated 600v, unless noted otherwise on Drawings.

C. FEEDERS: Flame retardant, moisture and heat resistant, thermoplastic, Type Letter THWN or THHN, 75 degrees C maximum operating temperature, rated 600V, unless noted otherwise on Drawings.

D. FLEXIBLE, HIGH TEMPERATURE, and any other special type of wire and cable shall be provided as indicated on Drawings.

E. LOW VOLTAGE conductor insulation shall be color coded per NEC.

F. MINIMUM CONDUCTOR SIZE shall be No. 12 AWG for power and lighting circuits and No. 14 AWG for control circuits. Conductors No. 10 AWG and smaller may be solid or stranded, No. 8 AWG and larger shall be stranded.

PART 3 – EXECUTION

3.01 INSTALLATION

A. PULLING FRICTION: Keep to a minimum using no more than the NEC allowed number of bends, as well as not to exceed maximum allowable pulling tensions derived from tables or formula provided by the several Wire Manufacturers.

B. USED APPROVED WIRE LUBRICANT of a type suitable for wire and/or raceway involved, such as Burndy "Silkon", "Albentonite", "Protectant 626", Ideal "Yellow–77", or Polywater "J".

C. FURNISH necessary reels, reel jacks and other pulling aids required to prevent damage to wires and cable.

D. DO NOT PULL WIRE until construction work in vicinity is complete enough to avoid damage to wires and cables in any manner.

E. IDENTIFY conductors with pressure sensitive tags as manufactured by Brady, when so indicated on Drawings.

F. WIRES AND CABLES REQUIRED shall be installed continuous without splice from source of supply to distribution equipment and from source of supply to motor, lighting or power outlet. In no case shall pull boxes be used for making splices; neither shall splices be installed in conduits.

G. MAKE conductor length for parallel feeders identical.

H. LACE OR CLIP groups of feeder conductors at distribution centers, pull boxes, wireways.

I. PROVIDE copper grounding conductors and straps.

J. INSTALL wire and cable in conduit.

K. INSTALL wire in conduit runs after concrete and masonry work is complete and after moisture is swabbed from conduits.

L. SPLICE only in accessible junction or outlet boxes.

M. CONDUCTOR CONNECTIONS:

1. USE approved pressure type solderless connectors and lugs for service entrance, feeder and equipment connections.

2. CONNECTORS shall be equal to Burndy, T & B, O–Z, or Penn Union, and shall be of a type compatible to conductors, location and load.

3. NEUTRAL CONNECTIONS AND TAPS shall be made individually, in order to prevent the possibility of an "open–neutral."

4. BRANCH CIRCUIT CONNECTIONS shall be made with UL approved solderless connectors equal to Buchanan, Scotch or T & B. Fixture connections shall be equal to those made by same Manufacturers. Any type used shall not depend solely upon a single insulating material to secure connection as well as to insulate it.

5. SOLDER JOINTS using Kester 50–50 solder and approved soldering paste equal to Nokorode, will be acceptable in lieu of mechanical pressure or solderless types for branch circuit and fixture connections.

6. BUS BAR CONNECTIONS shall be bolted with adequate nonferrous bolts, washers, and lock washers, after first either silver plating the bars or applying suitable non–oxidizing agents equal to No–Oxide.

7. LUG AND BUS BAR DRILLINGS shall be in accordance with applicable ASA/NEMA Standards. Connection bolts or screws shall be of bronze, copper, brass, or of adequately plated nonferrous material.

8. JOINTS AND TAPS shall be insulated with patented or molded plastic or insulators, or shall be taped suitably with Okonite or Scotch tapes. Tapes shall be compatible with conductor jackets, temperature, and other conditions.

N. ALL WIRE shall be color coded to indicate the various phases and neutral. Where color coding is impractical, approved 3/4 in wide tape bands, corresponding to Color Code, NEC Section 210.5, and as specified below shall be provided.

1. COLOR CODING for the system shall be as follows:

<u>For 120/208 Volt System</u>
Phase A – Black
Phase B – Red
Phase C – Blue
Neutral – White
Ground – Green

END OF SECTION

SECTION 16134

OUTLET BOXES

PART 1 – GENERAL

1.01 WORK INCLUDED

A. OUTLET BOXES.

PART 2 – PRODUCTS

2.01 CONDUIT OUTLET BODIES:

A. MANUFACTURERS/TYPES: Where indicated and/or where desirable, conduit installations shall be made using cast iron or cast aluminum outlet bodies equal to Crouse–Hinds "condulets", Appleton "Unilets", or Pyle–National "Pylets". Such fitting shall be appropriate for location and usage. They shall be used in combination with factory or field bends when indicated and/or when advisable.

B. COMPLETE OUTLET BODIES with gaskets, covers, hubs, reducers, and other accessories.

C. FINISH: Cadmium or equal if of steel. If of aluminum, they shall be essentially "copper–free". They shall not be used on conduits of dissimilar metals, except with written permission of Architect.

2.02 GENERAL

A. BOXES: Hot–dip galvanized, one piece, 1.25 oz/sq ft (381 g/sq meter) or cadmium plated, conform to UL requirements.

B. EXTERIOR BOXES: Cast or glass fiber reinforced plastic deep type.

C. FOR FLUSH MOUNTING IN WALLS: In masonry use deep boxes.

D. LIGHT OUTLETS, except as indicated otherwise on Drawings, shall be complete with outlet box, 4 ins. minimum trade size, and square or octagon in shape. Depth and the type shall conform with NEC volume requirements. Square style is preferable, but octagon may be used where desired as long as space requirements are met.

E. DEVICE OUTLETS: Except as otherwise indicated shall be complete with 4 inch sq box of suitable depth and with one or two gang device mounting rings.

F. MULTI–GANG OUTLETS shall be complete with gang boxes and matching rings.

G. SINGLE GANG SWITCH TYPE BOXES shall be used only where so indicated and then only in case device to be used has sufficient clearance within.

H. BOXES shall be firmly supported with patented hangers or supports, except as approved otherwise.

PART 3 – EXECUTION

3.01 INSTALLATION

A. VERIFY EXACT LOCATION, mounting height and usage of each outlet box. Boxes shall be set plumb and square with building walls, floors, and other elements. Maximum tolerance shall be 1/16 inch.

B. MOUNT outlet boxes flush.

C. ADJUST position of outlets in finished masonry walls to suit masonry course lines.

D. LOCATE boxes in masonry walls so that only a corner need be cut from masonry units.

E. DO NOT USE sectional or handy boxes unless specifically requested.

F. SHEET STEEL BOXES: Do not set where fixture and device requires cast or otherwise special outlet boxes.

PART 4 – LOCATION

4.01 LOCATIONS OF OUTLETS

A. STUDY Architectural and Structural Drawings as well as any Drawings of existing structures, prior to rough–in.

B. VERIFY exact mounting heights and exact locations for outlets. Adjust actual heights and locations to minimize masonry cutting by utilizing joints in masonry as much as possible.

C. STUBBING ARRANGEMENTS AND OUTLET ARRANGEMENTS: Verify for equipment connections, to be proper for equipment installed.

D. OUTLETS: Align, group and otherwise arrange in pleasing and logical arrangement with respect to architectural elements.

E. INSTALL OUTLETS flush and plumb unless otherwise noted. Long axis of a "Gang" shall be vertical except where the word "Horizontal" is noted, or unless available room dictates that outlet be set horizontally.

F. ALIGNMENT: Give special attention to alignment of outlets close or adjacent to one another.

G. REPORT all conflict with other Trades to Architect and Contractor immediately upon discovering same.

END OF SECTION

SECTION 16145

RECEPTACLES

PART 1 – GENERAL

1.01 WORK INCLUDED

A. RECEPTACLES.

1.02 SUBMITTALS

A. SUBMIT product information.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. ACCEPTABLE MANUFACTURERS:
1. Pass & Seymour.
2. Bryant.
3. Leviton.
4. Hubbell.

2.02 DEVICES

A. GROUND FAULT CIRCUIT INTERRUPTER (GFCI) duplex receptacles: Full gang size, polarized, duplex, parallel blade, U–grounding slot, Specification grade, rated at 20 amps, 125V. (Hubbell No. GFR5362SGGY).

B. COLOR: Provide gray receptacles.

C. See the drawings for special use receptacles.

PART 3 – EXECUTION

3.01 INSTALLATION

A. MOUNT receptacles vertically or as shown on Drawings.

B. DEVICES shall be installed in a neat manner, one per gang, in approved boxes, and firmly attached to boxes.

C. BOXES shall be clean of any foreign materials accumulated during construction.

END OF SECTION

SECTION 16147

PLATE COVERS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. PLATE COVERS.

PART 2 – PRODUCTS

2.01 MATERIALS

A. STEEL: Hot–dip galvanized, 1.25 ozs/sq ft (381 g/sq meter) minimum.

2.02 PLATES

A. SURFACE BOX PLATES: Beveled, steel, pressure formed for smooth edge to fit box.

B. WEATHERPROOF PLATES: Cast metal, gasketed, for receptacles, provide spring loaded gasketed doors.

C. WHERE TWO GANG BOXES are required for single gang devices, provide special plates with device opening in one gang and second gang blank.

PART 3 – EXECUTION

3.01 INSTALLATION

A. INSTALL cover plates on wiring devices.

B. DO NOT SUPPORT the device from the plate.

END OF SECTION

SECTION 16190

SUPPORTING DEVICES

PART 1 – GENERAL

1.01 WORK INCLUDED

A. CONDUIT SUPPORTS.

1.02 RELATED WORK

A. SECTION 16111: Conduit

PART 2 – PRODUCTS AND EXECUTION

2.01 CONDUIT SUPPORTS

A. SINGLE RUNS: Galvanized conduit straps or ring bolt type hangers with specialty spring clips. Don't use plumbers perforated straps.

B. VERTICAL RUNS: Channel support with conduit fittings.

2.02 ANCHOR METHODS

A. HOLLOW MASONRY: Toggle bolts or spider type expansion anchors.

B. SOLID MASONRY: Lead expansion anchors or preset inserts.

C. METAL SURFACES: Machine screws, bolts or welded studs.

D. WOOD SURFACES: Wood screws.

E. CONCRETE SURFACES: Self–drilling anchors or power–driven studs.

2.03 ANCHORS, FASTENERS AND MISCELLANEOUS SUPPORTS

A. COMPANION BASES OR BACKS shall be used with conduit clamps when conduit is exposed to weather or continuous moisture.

B. MULTIPLE RUNS OF CONDUIT on wall surfaces shall be mounted on surface or flush Unistrut channel.

END OF SECTION

PRINTS ISSUED

DATE	PURPOSE	NO.
02.01.10	FINAL PLANS	

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PROJECT NUMBER:
08386

SHEET TITLE:
ELECTRICAL SPECIFICATIONS

SHEET NUMBER:
SE-4
OF SE-5 SHEETS

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