

## SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and terminal cabinets for electrical wiring.

#### 1.3 SCOPE

- A. Furnish materials, tools, labor and supervision necessary to fabricate and install a complete electrical conduit system.
- B. Conduit systems shall be provided for all wiring systems, except where the Drawings, other Sections of the Specifications, or Codes specifically indicate that certain wiring may be installed without conduit.

#### 1.4 STANDARDS AND CODES

- A. Methods of fabrication and installation shall comply with the provisions of applicable Section NEC, Article 300.
- B. Materials shall be UL and NEC approved for the application intended.

#### 1.5 DESCRIPTION

- A. This Section describes the basic materials and installation requirements for conduit systems.

#### 1.6 QUALIFICATIONS

- A. The materials used in the fabrication of the conduit system shall be products of a manufacturer regularly engaged in the manufacturing of the specified material. Where a manufacturer is named for a particular material, the material of other manufacturers shall be acceptable provided the material meets requirements of the Specification.

## 1.7 SUBMITTALS

- A. Shop drawings or catalog cuts shall be submitted for conduits, connectors, fittings, boxes, and special or custom enclosures, including, but not limited to , underground pull boxes.
- B. Shop drawings for terminal cabinets.

## PART 2 - PRODUCTS

### 2.1 CONDUIT

- A. Rigid Conduit: Full weight threaded, rigid steel conduit, galvanized inside and out. Thread protective caps and couplings shall remain in place until used.
- B. Electrical Metallic Tubing (EMT): Thinwall, electrically welded cold rolled steel conduit, galvanized inside and out.
- C. Liquidtight Flexible Conduit: Metal conduit formed of one continuous length of spirally wound steel strip, with water and oil tight neoprene jacket. Use in damp or wet locations for final connections to motors and other equipment subject to movement or vibration.
- D. PVC Conduit: Conduit shall be sunlight resistant, Schedule 40.
- E. Flexible Metallic Conduit: Use for final connections to motors and other equipment subject to movement or vibration.

### 2.2 CONDUIT FITTINGS

- A. Rigid Conduit Fittings: Threaded, galvanized malleable iron or heavy steel, water and concrete tight. Grounding type nylon insulated bushings for connectors at cabinets, boxes and gutters.
- B. Metallic Tubing Fittings: Set screw or compression die-cast type.
- C. Liquidtight Flexible Conduit Fittings: Watertight gaskets, "O" ring and retainer. Nonmetallic conduit to have fittings approved for the use.
- D. Conduit Fittings: Exposed conduit fittings shall utilize conduit bodies for sharp turns, tees, etc.

### 2.3 OUTLET BOXES

- A. Material, size and installation for outlet boxes shall comply with NEC. Article 314.
- B. Boxes shall be Raco, Steel City, Appleton or equivalent.
- C. Outlets in exterior locations shall have gasketed weatherproof cover.
- D. Outlet boxes within the residential units shall be non-metallic.

## 2.4 PULL AND JUNCTION BOXES

- A. Construction, sizes and installation of pull and junction boxes shall comply with NEC, Article 314 and Tables 314.16 (A) and (B).
- B. Pull and junction boxes not specifically described in NEC, Article 314, shall be fabricated of heavy gauge galvanized steel with screw covers, plated screws and other hardware, unless other type of box material is called out on the Drawings.
- C. Pull and junction boxes for outdoor installations shall be NEMA 3R rated.

## 2.5 AUXILIARY GUTTERS

- A. Construction, sizes and installation of auxiliary gutters shall comply with NEC, Article 366.

## 2.6 HANGERS AND SUPPORTS

- A. Provide conduit hanger and support devices of approved type for method of supporting required, to include: structural steel members, suspension rods, conduit clamps, concrete inserts, expansion shields, beam clamps and welding pins. All devices shall have galvanized finish or other approved corrosion resistance finish.

## 2.7 FASTENERS

- A. Fasteners, including but not limited to screws, bolts, nuts, washers, and anchors installed outdoors and in underground boxes and vaults shall be stainless steel.
- B. Fasteners in dry indoor areas shall be plated or galvanized steel.
- C. Explosive-installed fasteners are not allowed.

## 2.8 TERMINAL CABINETS

### A. ACCEPTABLE MANUFACTURERS

- 1. Square D
- 2. Cutler-Hammer
- 3. Hoffman Engineering Company
- 4. Or Approved Substitution

### B. MATERIALS AND EQUIPMENT

- 1. Cabinet Types:
  - a. Doors with concealed hinges.
  - b. Door lock, keyed alike with panelboards.
  - c. Three-quarter inch plywood back. Finish with black insulating varnish or paint.
  - d. Size as indicated on drawings or as required to accommodate terminal blocks with 10% spare capacity.

- e. Panelboard type trims.
- f. Flush or surface as indicated on drawings.
- g. Concealed trim tabs.
- h. Code gauge galvanized steel.
- i. Painted to match panelboards.
- j. Baked enamel.
- 2. Terminal Strips:
  - a. Channel mounted snap-on type.
  - b. Individual gangable with nylon bases.
  - c. Tabular screw type rated at 300V to accommodate standard No. 12 wire.
  - d. Provide 10% spare terminals.
  - e. As manufactured by Square D, Buchanan, or equal.
  - f. Other terminal connecting strips, standoffs, etc. subject to approval upon receipt of proper submittal.

### PART 3 - EXECUTION

#### 3.1 CONDUIT INSTALLATION

- A. Exposed conduit shall be run parallel to the structure.
- B. No conduit shall be installed less than 6" from piping installed by other trades.
- C. Where specific size conduit is not called for on Drawings or in specification, Contractor shall select size required from Chapter 9 of NEC. Where specific sizes required by Drawings or Specifications are larger than Code requires, the larger size shall be installed. Minimum size shall be 1/2".
- D. Where un-galvanized conduit threads are exposed after assembly of the raceways, such threads shall be coated with a cold galvanizing compound such as Klein 51113 or CRC Zinc-It to prevent rusting. The area to be galvanized shall be thoroughly degreased before application of the cold galvanizing compound.
- E. Where metallic conduits below grade turn up to above grade, they shall be coated with Koppers Bitumastic compound or be covered with 3M Scotchrap Tape No. 50 applied using Scotchrap pipe primer from one foot below grade to one foot above finished grade or top of finished slab.

#### 3.2 OUTLET BOX INSTALLATION

- A. Outlet boxes shall be installed for fixtures, switches, receptacles and other devices.
- B. Approximate location of outlets is shown on the plans, but each outlet location as shown shall be checked by the Contractor before installing the outlet box.
- C. Outlets boxes shall be installed plumb and square with wall face.

### 3.3 PULL AND JUNCTION BOX AND GUTTER INSTALLATION

- A. Install pull boxes, junction boxes and auxiliary wiring gutters where indicated on Drawings and where required to facilitate installation of the wiring.

### 3.4 HANGER SUPPORT INSTALLATION

- A. Hangers and supports shall be installed for all conduit and boxes.
- B. Conduit and boxes shall not be attached to or supported from mechanical pipes, plumbing pipes or sheet metal ducts.

### 3.5 TERMINAL CABINET INSTALLATION

- A. Install cabinets where shown in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that they comply with requirements and serve the intended purposes. Comply with requirements of NEMA and NEC standards and applicable portions of NECA's "Standard of Installation".
- B. Wire in accordance with equipment manufacturer's printed instructions, directions, schematics, and as shown on drawings.
- C. Touch up scratched or marred surfaces to match original finish.

END OF SECTION 260533