

## SECTION 16190

### SUPPORTING DEVICES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION OF WORK

- A. The work of this section consists of providing labor, materials, tools, appliances and miscellaneous accessories associated with supports, anchors, sleeves and seals indicated herein and on Drawings and schedules.
- B. Types of supports, anchors, sleeves and seals specified in this section include the following:
  - 1. Clevis hangers.
  - 2. C-clamps.
  - 3. I-beam clamps.
  - 4. One-hole conduit straps.
  - 5. Round steel rods.
  - 6. Lead expansion anchors.
  - 7. Toggle bolts.
  - 8. Wall and floor seals.
- C. Supports, anchors, sleeves and seals furnished as part of factory-fabricated equipment, are specified as part of equipment assembly in other Divisions-16 sections.

##### 1.2 RELATED DOCUMENTS

- A. Drawings.
- B. General provisions of Contract, including General and Supplementary Conditions.
- C. Division 01 - Specification Sections.
- D. Section 16010 - General Electrical Provisions.

##### 1.3 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of supporting devices, of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Installer: Qualified with at least 3 years of successful installation experience on projects with electrical installation work similar to that required for project.

- C. NEC Compliance: Comply with NEC as applicable to construction and installation of electrical supporting devices.
- D. ANSI/NEMA Compliance: Comply with applicable requirements of ANSI/NEMA STD Pub No. FB1, "Fittings and Supports for Conduit and Cable Assemblies".
- E. MSS Compliance: Comply with applicable MSS standard requirements pertaining to fabrication and installation practices for pipe hangers and supports.
- F. NECA Compliance: Comply with National Electrical Contractors Association's "Standard of Installation" pertaining to anchors, fasteners, hangers, supports, and equipment mounting.
- G. UL Compliance: Provide electrical components which are UL-listed and labeled.
- H. FS Compliance: Comply with Federal Specification FF-S-760 pertaining to retaining strap for conduit, pipe and cable.

#### **1.4 SUBMITTALS**

- A. Product Data: Submit catalog cuts, specifications, installation instructions, for each type of support, anchor, sleeve and seal. Submit hanger and support schedule showing manufacturer's figure number, size, location, and features for each required hanger and support.
- B. Shop Drawings: Submit dimensioned drawings of fabricated products, indicating details of fabrication and materials.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED SUPPORTING DEVICES**

- A. General: Provide supporting devices complying with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation, and as herein specified. Where more than one type of device meets indicated requirements, selection is Installer's option.
- B. Support: Provide supporting devices of types, sizes and materials indicated and having the following construction features:
  - 1. Clevis Hangers: For supporting 2" rigid metal conduit, galvanized steel with 1/2" diameter hole for round steel rod, approximately 54 pounds per 100 units.
  - 2. Reducing Couplings: Steel rod-reducing coupling, 1/2" x 5/8" black steel approximately 16 pounds per 100 units.
  - 3. C-Clamps: Black malleable iron, 1/2" rod size, approximately 70 pounds per 100 units.
  - 4. I-Beam Clamps: Black steel, 1-1/4" x 3/16" stock, 3/8" cross bolt, flange width 2", approximately 52 pounds per 100 units.

5. One-Hole Conduit Straps: For supporting 3/4" rigid metal conduit, galvanized steel, approximately 7 pounds per 100 units.
  6. Two-Hole Conduit Straps: For supporting 3/4" rigid metal conduit, galvanized steel, 3/4" strap width, and 2-1/8" between centers of screw holes.
  7. Hexagon Nuts: For 1/2" rod size, galvanized steel, approximately 4 pounds per 100 units.
  8. Round Steel Rod: Black steel, 1/2" diameter, approximately 67 pounds per 100 feet.
  9. Offset Conduit Clamps: For supporting 2" rigid metal conduit, black steel approximately 200 pounds per 100 units.
- C. Anchors: Provide anchors of types, sizes and materials indicated and having the following construction features.
1. Lead Expansion Anchors: 1/2", approximately 38 pounds over 100 units.
  2. Toggle Bolts: Springhead, 3/16" x 4", approximately 5 pounds per 100 units.
  3. Manufacturers: Subject to compliance with requirements, manufacturers offering anchors which may be incorporated in the work include, but are not limited to the following:
    - a. Abbeon Cal Inc.
    - b. Ackerman Johnson Fastening Systems Inc.
    - c. Elcen Metal Products Co.
    - d. Ideal Industries, Inc.
    - e. Joslyn Mfg. and Supply Co.
    - f. McGraw Edison Co.
    - g. Rawplug Co. Inc.
    - h. Star Expansion Bolt Co.
- D. Sleeves and Seals: Provide sleeves and seals, of types, sizes and materials indicated and having the following construction features:
1. All Below Grade Floor and Wall Penetrations: Provide factory-assembled watertight wall and floor seals, suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws. O-Z Gedney, Type WSK or equivalent.
- E. Conduit Cable Supports: Provide cable supports with insulating wedging plug for non-armored type electrical cable in risers, construct body of malleable iron casting with hot dip galvanized finish.
- F. U-Channel Strut System:
1. Provide U-channel strut system for supporting electrical equipment, 16-gage hot dip galvanized steel, of types and sizes indicated; construct with 9/16" diameter holes, 8"

o.c. on top surface, with standard green finish, and with the following fittings which mate and match with U-channel:

- a. Fixture hangers.
  - b. Channel hangers.
  - c. End caps.
  - d. Beam clamps.
  - e. Wiring stud.
  - f. Thin wall conduit clamps.
  - g. Rigid conduit clamps.
  - h. Conduit hangers.
  - i. U-bolts.
2. Manufacturers: Subject to compliance with requirements, manufacturers offering channel system which may be incorporated in the work include, but are not limited to, the following:
- a. B-Line Systems, Inc.
  - b. Elcen Metal Products Co.
  - c. Greenfield Mfg Co., Inc.
  - d. Midland-Ross Corp.
  - e. Power-Strut Div., Van Huffel Tube Corp.
  - f. Unistrut Div, GTE Products Corp.

### **PART 3 - EXECUTION**

#### **3.1 FABRICATED SUPPORTING DEVICES**

A. Pipe Sleeves: Provide pipe sleeves of one of the following:

1. Sheet-Metal: Fabricate from galvanized sheet metal round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gages: 3" and smaller, 20 gage; 4" or 6", 16 gage; over 6", 14 gage.
2. Steel-Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.
3. Iron-Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.
4. Plastic-Pipe: Fabricate from Schedule 80 PVC plastic pipe; remove burrs.

B. Sleeve Seals: Provide Lead and Oakum sleeve seals, caulked between sleeve and pipe for sleeves located in foundation walls below grade, or in exterior walls.

END OF SECTION