

## SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 DESIGN REQUIREMENTS

- A. Provide equipment supports rated for the supported loads.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS, GENERAL

- A. Conduit Hangers: Galvanized steel with special accessories for purpose and adequate to support load imposed.
- B. Coatings: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance-using NEMA/UL approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors shall be hot-dip galvanized.
- C. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, and wall brackets.
- D. Fasteners: Types, materials, and construction features as follows:
  - 1. Expansion Anchors: Carbon steel wedge or sleeve type.
  - 2. Toggle Bolts: All steel springhead type.
- E. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit, or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.
- F. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for no armored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.
- G. U-Channel Systems: 16-gauge steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacture.
- H. Supports: Provide supporting devices of types, sizes and materials indicated; and having the following construction features:
  - 1. One-Hole Conduit Straps or Minerallac: For supporting 3/4 inch and smaller conduit, galvanized steel.
  - 2. Two-Hole Conduit Straps or Minerallac or industry approved equal: For supporting 1 inch and larger conduit, galvanized steel; 3/4 inch strap width; and 2-1/8 inch between center of screw holes.
- I. Fabricated Supporting Devices:
  - 1. General: Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.
  - 2. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

3. Pipe Sleeves: Provide pipe sleeves of one of the following:
  - a. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snap lock joint, welded spiral seams, or welded longitudinal joint.
  - b. Fabricate sleeves from the following gauge metal for sleeve diameter noted:
    - 1) 3-inch and Smaller: 20 gauge
    - 2) 4-inch to 6-inch: 16 gauge
    - 3) Over 6-inch: 15 gauge
  - c. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.
  - d. EMT, IMC, or Rigid Conduit.
- J. J-Hooks and Bridle Rings
  1. J-hooks and bridle rings may be used to support low voltage wiring systems.
- K. The following are prohibited.
  1. Plastic or fiber anchors.
  2. Drilling or structured steel members.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Conduit Hangers: Support individual conduit 1-1/2 inch and larger and all multiple conduit runs with hangers. Clamp conduits individually to each support.
- B. Supports and Hangers:
  1. Support and align all raceways, cabinets, boxes, fixtures, etc., in an accepted manner and as herein specified. Support raceways on accepted types of wall brackets, specialty steel clips or hangers, ceiling trapeze hangers or malleable iron straps. Provide lead expansion shields in concrete, machine screws, bolts or welding on metal surfaces, and wood screws on wood construction. Use of powder-driven studs is prohibited without express permission from the University Project Manager.
    - a. Mount all conduits to structure a minimum of 7 inches above any accessible type ceiling, or with spacing as required to permit relocation of recessed fixtures to any location.
  2. Structural and post tensioned concrete members shall not be drilled or pierced without prior approval from the University Project Manager.
  3. Where outlets are installed in steel stud type systems, provide additional cross bracing, bridging and/or straps as required to make outlet completely rigid prior to application of wall facing material.
  4. Design hangers and wall brackets so that maximum deflection will be no greater than 1/8 inch.
  5. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.
  6. Coordinate with the building structural system and with other electrical installation.
- C. Raceway Supports: Comply with the NEC and the following requirements:
  1. Conform to manufacturer's recommendations for selection and installation of supports.
  2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 pounds, provide additional strength until there is a minimum of 200 pounds safety allowance in the strength of each support.
  3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
  4. Use of ceiling support wires is unacceptable.
  5. Support parallel runs of horizontal raceways together on trapeze-type hangers. Use 3/8-inch diameter or larger threaded steel rods for support. Threaded rod shall be covered by 1/2 inch conduit from bottom of (trapeze) support to 6-inches above cable tray.

6. Support individual horizontal raceways by separate pipe hangers.
  7. Space supports for raceways in accordance with NEC.
  8. In all runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.
  9. Threaded rod supports to have bottoms cut off at a maximum length equal to rod diameter below bottom double nut. Remove sharp edges.
- D. Miscellaneous Supports: Support miscellaneous electrical components separately and as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panel boards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices.
- E. In open overhead spaces, support metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an engineer approved type of fastener not more than 24 inches from the box.
- F. Sleeves: Install in walls and all other fire-rated floors and walls for raceways and cable installations as required. Where sleeves through floors are installed, extend above finish floor. For sleeves through fire rated-wall or floor construction, apply UL listed fire stopping sealant in gaps between sleeves and enclosed conduits and cables. See Engineering plans for location and extent of fire rated assemblies.
- G. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, bus ways, cabinets, panel boards, transformers, boxes, disconnect switches, and control components in accordance with the following:
1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Powder-driven studs are not acceptable. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.
  2. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.
  3. Ensure that the load applied to any fastener does not exceed 25% of the proof test load. Use vibration- and shock-resistant fasteners for attachments to concrete slabs.
- H. Telecommunications Systems Cable Supports: Use cable tray or telecommunications approved cable supports.

**END OF SECTION 26 05 29**