SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Vibration and seismic controls for electrical equipment and systems.

1.03 PERFORMANCE REQUIREMENTS

A. Delegated Design: Shop drawings, certified by a professional engineer, shall be provided for the seismic restraints. The shop drawings shall include details for restraints' fabrication and installation including anchorage and attachments to the structure.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.04 SUBMITTALS

A. Product Data: For each type of hanger or support furnished under this Section. Indicate materials, gauges, and methods of attachment.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details for the following: trapeze hangers, steel slotted channel system, and seismic restraints.

1.05 COORDINATION

A. Coordinate size and location of the concrete bases and anchor-bolt inserts.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Hot-dip galvanized, comply with MFMA-4, factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.
   b. Cooper B-Line.
   c. Thomas & Betts Corporation.
   d. Unistrut.
2. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Galvanized steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug, or plugs for non-armored electrical conductors or cables in the riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Hilti Inc.
      2) ITW Ramset/Red Head.
      3) MKT Fastening.
      4) Simpson Strong-Tie Co.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Cooper B-Line,Inc.
      2) Hilti Inc.
      3) ITW Ramset/Red Head.
      4) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Galvanized threaded steel, at least 3/8 inch diameter or larger if required to support loads.

2.02 SEISMIC REQUIREMENTS

A. Seismic Performance: Furnish and install electrical equipment to resist seismic forces in accordance with referenced Building code.

B. Seismic restraint shall be provided for the electrical equipment such as unit substations, switchboards, panels, transformers, generators, bus ducts, conduits, cable trays and lighting fixtures.

C. Manufacturer of the seismic control products shall have the following responsibilities.
1. Determine seismic restraint sizes, type and locations.
2. Provide equipment seismic restraints.
3. Provide installation instructions, drawings and field supervision to insure proper installation and performance.
4. Certify seismic restraint design and installation upon completion of work.

D. Seismic control products manufacturers:

1. Ace Mountings Co., Inc.
2. Isolation Technology, Inc.
3. Mason Industries.
4. Vibration Eliminator Co., Inc.
5. Vibration Mountings & Controls, Inc.

2.03 VIBRATION ISOLATORS

A. Vibration Isolation Type DNP (Double Neoprene Pad)

1. Neoprene pad isolators shall be formed by two layers of 1/4 inch to 5/16 inch thick ribbed or waffled neoprene, separated by a stainless steel or aluminum plate. These layers shall be permanently adhered together. The pads shall be sized so that they will be loaded within the manufacturer's recommended range.
2. Manufacturers: Vibration Mountings and Controls, Inc.- Series Shear Flex, Mason Industries- type WSW, Amber/Booth – type NR, or equal.

B. Vibration Isolation Type HN (Hanger Neoprene)

1. Vibration isolation hangers shall consist of neoprene-in-shear or glass fiber element contained in steel housing. Neoprene neck bushing shalll be provided where the hanger rod passes through the hanger housing to prevent the rod from contacting the hanger housing. The diameter of the hole in the housing shall be sufficient to permit the hanger rod to swing through a 30 degree arc before contacting the hanger housing.
2. Manufacturers: Vibration Mountings and Controls, Inc.- type RHD or RFD, Mason Industries- type HD, Amber/Booth – type BRD-A, or equal.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by referenced Electrical Code. .

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so a capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

D. Conduit Supports:

1. Conduits in single runs or groups of two: Support by means of one-hole cast metal clamps and clamp backs.

2. Banks of three more conduits: Construct racks from steel support channels, channel fittings, and thermoplastic fasteners with associated conduit or tubing clips.

3. For support of conduit exposed to exterior, use hot-dip galvanized channels and fittings and hot-dip galvanized, stainless steel, or other non-corroding fasteners.

E. Cabinet and Box Supports: Field fabricate mounting racks from steel support channels and fittings. Fabricate racks for use outdoors from hot-dip galvanized support channels, fittings and fastening hardware.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements.

B. Attachment to Roof Joists: Attach hangers to the top chord or bottom chord panel point or panel point provided by applying a vertical web member. The maximum load shall be as allowed by the structural drawings and specification.

C. Attachment to Beams: Attach hangers to beams with clamp attachments which engage both edges of the beam flange. Locate the hanger directly below the web of the beam.

D. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

E. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or spring-tension clamps.
5. To Light Steel: Sheet metal screws.
6. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, and other devices on slotted-channel racks attached to substrate.
7. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 PAINTING

A. Touchup: Comply with requirements in Division 09 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29