

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install hangers and supports for electrical systems.
2. Area Classifications: Materials shall be suitable for the area classification(s) shown or indicated on the Drawings, and specified in Section 26 05 05, General Provisions for Electrical Systems.

B. Related Sections:

1. Section 05 05 33, Anchor Systems.
2. Section 26 05 05, General Provisions for Electrical Systems.
3. Section 26 05 33.13, Rigid Conduits.

1.2 REFERENCES

A. Standards referenced in this section are:

1. ASTM A123/A123M, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
2. ASTM A1011/A1011M, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
3. ASTM E84, Test Method For Surface Burning Characteristics of Building Materials

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer:
 - a. Minimum of five years of experience producing substantially similar equipment and able to show evidence of at least five installations, each in satisfactory operation for at least five years in the continental United States.
 - b. Equipment shall be manufactured in the United States.
2. Professional Engineer for Delegated Design:
 - a. Engage a registered professional engineer legally qualified to practice in the jurisdiction where the Project is located and experienced in providing engineering services of the kind indicated.

- b. Submit qualifications data.
- c. Responsibilities include but are not necessarily limited to:
 - 1) Carefully reviewing system performance and design criteria stated in the Contract Documents.
 - 2) Preparing written requests for clarifications or interpretations of performance or design criteria for submittal to Engineer by Contractor.
 - 3) Preparing or supervising the preparation of design calculations and related drawings, Shop Drawings, testing plan development, test-result interpretation and a comprehensive engineering analysis verifying compliance of the system with the requirements of the Contract Documents.
 - 4) Signing and sealing all calculations and design drawings, and Shop Drawings.
 - 5) Certifying that:
 - a) it has performed the design of the system in accordance with the performance and design criteria stated in the Contract Documents, and
 - b) the said design conforms to all applicable local, state and federal codes, rules and regulations, and to the prevailing standards of practice.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. Detailed installation drawings showing dimensions and compatibility with proposed layout.
 - b. Delegated Design: all drawings, design calculations, and a letter indicating that the hanger and support systems have been properly designed shall be signed and sealed by a registered professional engineer legally qualified to practice in the jurisdiction where the Project is located.
 - c. Certification by the delegated design Registered Professional Engineer that professional engineer has performed design of the hanger and support systems in accordance with performance and design criteria stated in the Contract Documents, and that design conforms to all applicable local, state, and federal Laws and Regulations, and to prevailing standards of practice.
 - 2. Product Data:
 - a. Manufacturer's name, product designation, and catalog number of each material item proposed for use.
 - b. Manufacturer's specifications including material, dimensional and weight data, and load capacity for each supporting system component proposed for use.

- c. Pictorial views and corresponding identifying text of each component proposed for installation.
 - d. Documentation that confirms product compatibility with Laws and Regulations.
- B. Informational Submittals: Submit the following:
- 1. Certifications:
 - a. Submit certifications required under this Section.
 - 2. Manufacturer's Instructions:
 - a. Manufacturer's installation instructions, including recommended tightening torque values for all nuts and bolts.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide products of one of the following:
- 1. B-Line.
 - 2. Kindorf.
 - 3. Unistrut
 - 4. Approved equivalent.

2.2 MATERIALS

- A. Strut, Fittings, and Accessories:
- 1. General
 - a. Unless otherwise shown or indicated, strut shall be 1-5/8 inches by 1-5/8 inches. Double struts shall be two pieces of the same strut, welded back-to-back at the factory.
 - b. Attachment holes, when required, shall be factory-punched on hole centers approximately equal to the cross-sectional width and shall be 9/16-inch diameter.
 - c. Fittings, braces, brackets, hardware, and accessories shall be Type 304 stainless steel.
 - d. Strut nuts shall be spring captured Type 304 stainless steel.
 - e. Square and round washers shall be Type 304 stainless steel.
 - 2. Strut materials shall be suitable for area classifications indicated in Section 26 05 05, General Provisions for Electrical Systems, and shown or indicated on the Drawings.
 - a. Dusty Locations:
 - 1) Strut shall be 12-gage carbon steel, hot-dip galvanized after fabrication, complying with ASTM A123/A123M.
 - b. Wet Locations:
 - 1) Strut shall be 12-gage Type 316 stainless steel.
 - c. Corrosive Locations:

1) Strut shall be 12-gage Type 316 stainless steel.

B. Hanger Rods:

1. Material:
 - a. Dry Locations: All-thread, zinc-coated
 - b. Wet, Corrosive, or Hazardous Areas: Stainless steel.
2. Size: Not less than 3/8-inch diameter, unless otherwise shown on the Drawings or specified.

C. Beam Clamps for Attaching Threaded Rods or Bolts to Beam Flanges for Hanging Struts or Conduit Hangers:

1. Beam clamps shall be stainless steel equipped with stainless steel square-head set screw, and shall include threaded hole sized for attaching the all-thread rod or threaded bolt.

D. Miscellaneous Hardware:

1. Bolts, screws, and washers shall be stainless steel.
2. Hex Nuts: Shall be stainless steel and include nylon inserts.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine conditions under which the Work will be installed and notify ENGINEER in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Provide hangers and supports for electrical systems with necessary channels, fittings, brackets, and related hardware for mounting and supporting materials and equipment. Provide anchor systems, concrete inserts, and associated hardware for proper support of electrical systems.
- B. Install equipment and devices on hangers and supports as shown on the Drawings, as specified, and as required.
- C. Install hangers and supports level, true, free of rack, and parallel and perpendicular to building walls and floors, so that the hangers and supports are installed in a neat, professional, workmanlike manner.
- D. Holes in suspended ceilings for rods for hangers and supports and other equipment shall be provided adjacent to bars, where possible, to facilitate removal of ceiling panels.

- E. Coordinate installation of hangers and supports with equipment, cabinets, consoles, panels, enclosures, boxes, conduit, cable tray, wireway, busway, cablebus, piping, ductwork, lighting fixtures, and other systems and equipment. Locate hangers and supports clear of interferences and access ways.
- F. Anchor Bolts, Expansion Anchors, and Concrete Inserts: Shall be in accordance with Section 05 05 33, Anchor Systems, and requirements of this Section.
- G. Mounting of Conduit:
 - 1. Provide space of not less than 1/4-inch between conduit surfaces and abutting or near surfaces except struts, cable trays, steel beams, and columns.
 - 2. Fasten conduit to struts, cable trays, steel beams, and columns using specified clamps and straps as shown, specified, and required.
 - 3. Devices shall be compatible with size of conduit and type of support. Following installation, size identification shall be visible and legible.
 - 4. Install conduit supports and fasteners in accordance with Section, 26 05 33.13, Rigid Conduits.
- H. Supports for Cabinets, Consoles, Panels, Enclosures, and Boxes:
 - 1. Freestanding: Unless otherwise specified or shown on the Drawings, provide supports for floor-mounted equipment, cabinets, consoles, panels, enclosures, and boxes. Such supports shall be 3.5-inch high concrete equipment base with a 45 degree chamfered edge. Base shall extend two inches beyond outside dimensions of equipment on all sides.
 - 2. Wall-Mounted:
 - a. Provide space not less than 1/4-inch between cabinets, consoles, panels, enclosures, and boxes and the surface on which each is mounted. Provide non-metallic or stainless steel spacers as required.
 - b. Do not mount equipment, enclosures, panels, and boxes directly to beams or columns. Mount struts to beams or columns using beam clamps, and mount equipment, enclosures, panels, and boxes to the struts.
 - 3. Floor Stand Rack:
 - a. Where equipment, cabinets, consoles, panels, enclosures, and boxes cannot be wall-mounted, provide an independent floor stand rack.
 - b. Floor stand rack shall consist of struts, plates, brackets, connection fittings, braces, accessories, and hardware assembled in a rigid framework suitable for mounting of intended materials and equipment.
 - c. Equip floor stand racks with brackets and bases for rigidly-mounting the framework to the ceiling or floor, as applicable; or equip floor stand racks with beam clamps, angle plates, washers, and bolts for fastening to beam flanges, as applicable.
 - d. When equipment, cabinets, consoles, panels, enclosures, and boxes weigh more than 100 pounds:

- 1) Main vertical supports of floor stand rack assemblies shall be back-to-back struts.
 - 2) Bracing, clamping and anchoring of each floor stand rack shall be sufficient to ensure rigidity of the floor stand rack with the intended equipment, enclosures, conduit, cable tray, busway, cablebus, and wireway installed. Floor stand racks shall not be deflected more than 1/8-inch by a 100-pound force applied at any point on the floor stand rack in any direction.
- I. Drilling into beams or columns is not allowed unless authorized by ENGINEER.
- J. Tighten nuts and bolts to the manufacturer's recommended torque values.
- K. Field Cutting:
1. Cut edges of strut and hanger rod shall have rounded corners, edges beveled, and burrs removed. If field cutting the strut is required, use clean, sharp, dedicated tools. Remove oil, shavings, and other residue of cuttings prior to installation.
 2. Coatings: To prevent corrosion:
 - a. Coat cut edges with epoxy-base touchup paint.
 - b. Coat cut edges with zinc-rich paint.

++ END OF SECTION ++