

## **Section 16073**

### **Hangers and Supports for Electrical Systems**

#### **PART 1: General**

- 1.1 *Summary* – This Section includes the following:
  - 1.1.1 Hangers and supports for electrical equipment and systems.
  - 1.1.2 Construction requirements for concrete bases.
- 1.2 *Definitions* –
  - 1.2.1 *RMC* – Rigid metal conduit.
  - 1.2.2 *RNC* – Rigid Non-metal conduit.
- 1.3 *Performance Requirements* –
  - 1.3.1 Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
  - 1.3.2 Supports shall be adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force. All hanger and support designs subject to ECUA and engineer approval.
- 1.4 *Submittals* –
  - 1.4.1 *Product Data* – For equipment support systems.
  - 1.4.2 *Shop Drawings* – Show fabrication and installation details and include calculations for equipment supports.
  - 1.4.3 *Certifications* – Welding certificates.
- 1.5 *Quality Assurance* –
  - 1.5.1 *Welding* – Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 1.5.2 *Standards* – Comply with NFPA 70.
- 1.6 *Coordination* –
  - 1.6.1 Coordinate size and location of concrete bases.
  - 1.6.2 Coordinate installation of equipment supports.

## **PART 2: Products**

### **2.1 Support, Anchorage, And Attachment Components –**

2.1.1 *Raceway and Cable Supports* – As described in NECA 1 and NECA 101.

2.1.2 *Conduit and Cable Support Devices* – Stainless Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

2.1.3 *Mounting, Anchoring, and Attachment Components* – Items for fastening electrical items or their supports to slab surfaces include the following:

2.1.3.1 *Mechanical-Expansion Anchors* – Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

2.1.3.1.1 *Manufacturers* – Subject to compliance with requirements, provide products by one of the following:

2.1.3.1.1.1 Cooper B-Line, Inc.; a division of Cooper Industries.

2.1.3.1.1.2 Empire Tool and Manufacturing Co., Inc.

2.1.3.1.1.3 Hilti Inc.

2.1.3.1.1.4 ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

2.1.3.1.1.5 MKT Fastening, LLC.

## **PART 3: Execution**

### **3.1 Support Installation –**

3.1.1 *Standards* – Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

3.1.2 *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.

3.1.3 *Mounting and Anchorage of Surface-Mounted Equipment and Components* – Anchor and fasten electrical items and their supports to rack structural elements by the following methods unless otherwise indicated by code:

3.1.3.1 To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.

3.1.3.2 To Light Steel: Sheet metal screws.

3.1.4 Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.2 *Installation of Fabricated Metal Supports –*

3.2.1 Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.2.2 Comply with AWS D1.1/D1.1M.

3.3 *Concrete Bases –*

3.3.1 Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

3.3.2 Use 3000-psi, 28-day compressive-strength concrete or better.

3.3.3 Anchor equipment to concrete base.

3.3.3.1 Place and secure anchorage devices. Use supported equipment Manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3.3.2 Install anchor bolts to elevations required for proper attachment to supported equipment.

3.3.3.3 Install anchor bolts according to anchor-bolt Manufacturer's written instructions.

3.4 *Painting –*

3.4.1 *Touchup* – Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

3.4.1.1 Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.