

## **SECTION 271116 - CABINETS, RACKS, FRAMES AND ENCLOSURES**

### **PART 1 - GENERAL**

#### **1.1 SUBMITTALS**

A. Product Data:

1. Product Datasheets.
2. Bill of Materials (BOM):
  - a. At the top of each BOM list, identify the following:
    - 1) Rack Device.ID.
    - 2) Name and number of the space where the rack is located.
    - 3) Name of the systems the rack supports.
    - 4) Rack type.
  - b. Enumerate the quantity, brand, model and description of the rack and each option and accessory being furnished with the rack (e.g., sides, casters and fans).

B. Shop Drawings:

- a. Enlarged plans of the spaces housing equipment racks.
  - 1) Plans shall call out the Type and Device ID of the rack.

C. Closeout Submittals:

1. Product data.
2. As-built drawings:
  - a. Enlarged plan depicting the as-installed locations of the racks.

#### **1.2 REFERENCES**

A. Definitions:

1. Where the term “equipment rack” or “rack” is used, in either the singular or plural form, it refers generically to products that are designed for and normally used to house and/or mount 19-inch, 23-inch and 25-inch EIA standard rack mounted equipment. Racks come in multiple forms, sizes, finishes and styles.
2. Where asterisks (\*) are used in part numbers, they represent alphanumeric variables. These variables typically represent that portion of a model or product number that must be established when ordering product based upon the size, color, accessories and other information specified.

### **1.3 COORDINATION**

- A. Review and coordinate the sizes, quantity, and location of racks/cabinets/enclosures to ensure they will adequately support the work of this Division and Division 28 Systems (where applicable).
  - 1. Coordinate requirements of all systems to provide a coordinated and usable installation.

### **1.4 SYSTEM DESCRIPTION**

- A. Furnish and install all Equipment Racks (see “Definitions”), accessories and products identified in this section, and as shown on the Drawings, and as additionally required to support the installation of systems and equipment specified in other related sections.
  - 1. Mount securely as specified and shown.
- B. Provide all rack hardware and accessories as specified.
  - 1. Provide in quantities as shown on the Drawings and as specified.
- C. Provide Rack Bus Bar (RBB) on each Rack.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Products furnished of each Type shall be manufactured by a single manufacturer, bear the same brand name, be the same finish color and texture, and be from the same product model series, except where otherwise indicated.
- B. Accessories furnished for equipment racks shall be as manufactured from the same manufacturer as the rack served, except where otherwise indicated.
- C. Black shall be the default color for racks. Provide alternate colors where specified.
- D. Racks that are located adjacent to one another shall be matching size, color, fit and finish except where otherwise indicated.
- E. Rack sizes. Unless another size of rack is identified in a schedule or indicated on the Drawings, provide the largest RU rack size option available of the Type specified, if another RU size is not defined as the default size.
- F. Additional rack accessories:
  - 1. Refer to the Drawings for additional requirements for rack assemblies.
  - 2. Provide additional manufacturer recommended accessories for installation of products specified.

G. Rack Side Panels:

1. Where equipment racks utilize accessory side panels, and where such racks are detailed on the Drawings to be ganged together, only one set of side panels is required per model group that is installed adjacent.
  - a. Where more than one depth of enclosed cabinet is utilized in a row, side panels shall be provided between the different depths.

## 2.2 SUBSTITUTION LIMITATIONS

- A. Approved qualifying manufacturer status notwithstanding, substitute equipment racks may not differ in exterior physical dimensions as compared to the specified equipment racks by more than  $\pm 3/4$  inch in any dimension, without pre-bid model-specific review and approval. Substitute racks with dimensions that differ greater than this shall not be considered after award of the Contract.

## 2.3 EQUIPMENT RACKS

A. Open Frame Types:

1. Manufacturers: Subject to compliance with the requirements, provide the basis of design product or a comparable product by one of the following manufacturers:
  - a. Middle Atlantic Products.
  - b. Great Lakes Case & Cabinet.
  - c. Ortronics/Legrand.
  - d. Panduit.
  - e. CPI Chatsworth Products
2. Type R4:
  - a. Free standing, gangable, open frame, 4-post design.
  - b. Construction: Steel.
  - c. Finish: Durable powder coat.
  - d. Available in the following standard vertical RU sizes: 45.
  - e. Field configurable inward and outward turning support base.
  - f. UL Listed. Listed capacity: 800 lbs.
  - g. Depth, usable: 30.00 inches.
  - h. Depth, overall: 30.31 to 42.00 inches, base orientation dependent.
  - i. Width: 21.25 inches.
  - j. Height: 84.22 inches.
  - k. Rack mounting width: 19-inch EIA horizontal rack rail spacing.
  - l. Cage-nut mounting rails.
  - m. Open top. Designed for direct connection of ladder rack.
  - n. Additional rail kit pairs (PROR4CN-RR45), EIA vertical mounting-hole space, with hardware included.

- o. Dual-sided (front and back) cable duct with pre-installed cable grommets and front door, required as indicated on the Drawings:
  - 1) 6-inch width: Middle Atlantic VCD-6-45-DC.
  - 2) 10-inch width: Middle Atlantic VCD-10-45-DC.
  
- p. Basis of Design:
  - 1) 45 RU (78.75 inch VMS): Middle Atlantic model R4CN-4530B, plus accessories.
  - 2) Provide 100 cage nuts with 12-24 screws: Chatsworth 12639-001 (25pk)]

## 2.4 RACK ACCESSORIES

A. Manufacturers: Subject to compliance with the requirements, provide the basis of design product or a comparable product by one of the following manufacturers:

1. Middle Atlantic Products.
2. Atlas Sound.
3. Raxxess / Chief.
4. Lowell Manufacturing.
5. Hubbell.
6. Hoffman.
7. X-Mark.
8. Chatsworth.
9. Ortronics/Legrand.
10. Great Lakes Case & Cabinet.
11. Panduit
12. IT Watchdog

B. Rack Mounting Screws:

1. Truss-type screw head.
2. Black finish.
3. Matching size and color nylon protective washer.
4. For Racks with #10-32 threaded rack rails.
  - a. #10-32 thread.
  - b. Basis of Design: Middle-Atlantic model HP.
    - 1) Quantity: Three (3) Phillips-drive screw/per RU/per rack.
  - c. Basis of Design: Middle-Atlantic model HSK.
    - 1) Quantity: One (1) Square-post security drive/per RU/per rack.
5. For Racks with #12-24 threaded rack rails.
  - a. Basis of Design: Middle Atlantic model HP-24.
  - b. Quantity: Four (4) Phillips-drive screw/per RU/per rack.

6. For Racks with 6MM cage-nut rack rails.
  - a. Basis of Design: Middle-Atlantic model HP-6MM.
  - b. Quantity: Four (4) Phillips-drive screw/per RU/per rack.

C. Grounding Busbar:

1. Solid bare copper.
2. Cross sectional area: 0.375 square inches minimum (typically 0.25 inches thick by 1.5 inches wide).
3. Length: Equivalent to the vertical RU of the rack served.
4. Drilled and tapped #10 holes for ground cable connections.
5. Screws: Supplied with #10 copper machine-threaded screws, one (1) per RU.
6. Quantity: One (1) per equipment rack; additional units where indicated.

## 2.5 CABLE MANAGEMENT

A. Lacing Strips:

1. Horizontally Mounted:
  - a. Designed for mounting to rear rack rails.
  - b. Solid or perforated bar construction, designed for dressing and supporting wires that route horizontally between sides of rack and from sides of racks to mounted equipment.
  - c. Available in various shapes and sizes to accommodate a wide variety of cable types, bundle sizes, and rack equipment configurations.
  - d. Basis of Design: Middle Atlantic LBP-\*\*\*\*\*. Provide specific models to suit the application. Coordinate with equipment installers.
  - e. Quantity: Minimum one (1) per each RU of cable termination panels.
2. Vertically Mounted:
  - a. Available in various lengths to match the number of RUs of the rack served.
  - b. Perforated strip designed to accommodate types of wire ties, including hook-and-loop type.
  - c. Basis of Design: Middle Atlantic model LACE-\*\*-OP, sized to match rack RU.
  - d. Quantity: Two (2) per rack, additional units where indicated.

B. Wire Management Panels:

1. Manufacturers: Subject to compliance with the requirements, provide the basis of design product or a comparable product by one of the following manufacturers:
  - a. Middle Atlantic Products
  - b. Hubbell.
  - c. Leviton.

- d. Ortronics/Legrand.
  - e. Panduit.
2. Type A: Cable management panels shall be of this type unless specifically noted otherwise on the Drawings.
- a. Rack mountable design.
  - b. Front and rear mounted horizontal metal slotted rings.
  - c. Basis of Design:
    - 1) 1 RU (1.75 inches): Middle Atlantic HCM-1DR
    - 2) 2 RU (3.50 inches): Middle Atlantic HCM-2DR

### **PART 3 - EXECUTION**

#### **3.1 COORDINATION**

- A. Coordinate with each party providing product that will be housed within the racks. Review rack configurations to ensure they complement the systems being provided.
- B. Coordinate the delivery and installation to meet the workflow and schedules of parties reliant upon the product for their portion of the Work.

#### **3.2 INSTALLATION**

- A. Equipment Racks:
  - 1. General:
    - a. Secure fixed-position, non-portable racks using removable threaded fasteners to prevent from moving or tipping.
    - b. Secure racks without casters to the floor allowing a 36-inch minimum clearance between the rearmost part of the rack and the nearest obstruction. See the Drawings for additional and more stringent requirements.
    - c. Install doors, side panels and other accessories specified.
    - d. Install bushings or grommets at cable entry and exit points to protect cables.
    - e. Clean, prep and paint visible conduits using oil-based paint that matches the color of the rack.
    - f. Comply with rack manufacturers' printed instructions and guidelines for rack installation.
  - 2. Open Frame/Relay Types:
    - a. Securely bolt rack to the floor.
    - b. Install lateral supports to nearby walls to ensure lateral stability.
- B. Rack Accessories:
  - 1. Grounding Bus Bar:

- a. Install grounding bus bars in the rear of racks.
  - b. Coordinate location with equipment being housed within the rack and for full adjustability of the rack rails.
2. Filler Panels:
- a. Install filler panels within each equipment rack.
  - b. The size, location and ratio of blank-to-vent filler panels shall be as required to assure proper ventilation of equipment.
  - c. Mount the filler panels using approved mounting hardware, ensuring that unused spaces within the equipment rack are covered.
3. Ventilation Products:
- a. Furnish and install ventilation products as specified and indicated on the Drawings. Test operation of ventilation products and adjust as necessary.
4. Cable Management Products:
- a. Install horizontal and vertical cable lacing bars in locations to optimize support and grouping of cables within the equipment racks.
  - b. Mount bars using hardware recommended by the product manufacturer. Mount securely.

### **3.3 GROUNDING AND BONDING**

- A. Install a grounding busbar in each equipment rack and bond to equipment rack.

### **3.4 IDENTIFICATION**

- A. Label each rack.

**END OF SECTION 271116**