Polargy PolarPlexTM

Floor Mounted Infrastructure (Containment/Pathway System)

Hot/Cold Aisle Containment System Specification

**PART 1 - GENERAL**

* 1. SUMMARY

1. Floor Mounted Infrastructure (FMI) for Aisle Containment and Cable/Power Management Pathways with Vertical Panels and Sliding Doors used for either Hot or Cold Aisle Containment.  
   1. SYSTEM DESCRIPTION
2. Each FMI is to consist of a floor mounted framing system that supports an aisle containment plenum as well as Cable/Power Management pathways. Each FMI will have sliding doors supported from the framing system and floor. To fill empty rack spaces each FMI will include Rack Gap Panels that are supported from the framing system. The entire system will be independent of the equipment racks.

1.3 DESIGN REQUIREMENTS

1. Prefabrication of components in order to speed FMI installation.
2. The FMI shall be designed to be capable of supporting vertical and lateral structural loads in accordance with local structural codes.
3. Structural loads for cable and power pathways/trays, communication cables and power cables/busways, and light fixtures are also to be supported from the FMI.
4. In addition to the weight of the FMI itself, the floor mounted framing system shall be capable of supporting structural loads of 100lbs per linear foot.
5. For the entire weight of the FMI and planned structural loads, the FMI shall be capable of resisting the required earthquake forces for the location, in accordance with the provisions of American Society of Civil Engineers Standard ASCE/SEI 7-10.
6. Each FMI shall be capable of accommodating 3” of total vertical movement (2” downward, 1” upward) at the interface between the FMI and ceiling.
7. Provide a sliding door at the end of each aisle. The sliding door should be a dual door, center opening type with auto-close and hold open features.
8. The FMI shall have the capability to remove 1 or more equipment racks from the continuous row without removal of the FMI to allow the entire exchange of a fully loaded equipment rack.
9. Where equipment racks are not installed, each FMI shall include tool-lessly removable Rack Gap Panels. Securing of Rack Gap Panels shall be to the FMI framing structure.
10. FMI Vertical Panels shall be tool-lessly removable to allow access to the cable and power trays from the contained side of the aisle.

1.4 PERFORMANCE REQUIREMENTS

1. The FMI shall have containment integrity to meet or exceed a minimum combined surface area leakage of no more than 3.0% of the total contained zone surface area.
2. The FMI shall have containment integrity such that no gaps are larger than 0.25” other than the door bottoms that serve as safety pressure relief path when exhaust air and supply air fall out of balance.

1.5 SUBMITTALS

1. Bid Submittals:
   1. Product Data: Provide cut sheets, specification sheets, installation instructions, and material characteristics for manufactured products and assemblies.
   2. Indicate FMI system layout, plans and elevations, rough dimensions, weights, and system components requiring interface with other systems or structures.
   3. Include the time required for preparing shop drawings, descriptive literature, and material lists.
   4. Include a schedule of the time required for manufacturing and onsite final fabrication and installation time.
   5. Indicate a preferred sequencing and coordination with other trades and installation activities.
2. Action Submittals:
   1. Product Data: For each product and accessory include dimensions and manufacturers' technical data on features, performance, ratings, and finishes.
   2. Shop Drawings for each FMI: Dimensioned plans, elevations, sections, and details. Include floor plans showing dimensioned layout and support locations, type of support, and weight on each support.
   3. Structural engineering documentation for the FMI.
   4. Documents shall also be submitted in PDF for Drawings and Microsoft Word for text format documents.
3. Closeout Submittals:
   1. Spare and Accessory Part/Price List.
   2. Final Shop Drawings if as built substantially different from original drawings.

1.6 QUALIFICATIONS

1. Manufacturer: Company specializing in manufacturing products specified with minimum six years documented experience.
2. Installer: Company specializing in the installation of products and systems specified with minimum six years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

1. Deliver materials to the project site in original wrappings and containers, labeled with manufacturer’s name, and aisle/room/location number, if any.
2. Coordinate with customer for material delivery and staging. The customer shall store/stage materials in their original, undamaged wrappings and containers, inside an area protected from weather, moisture, soiling, extreme temperatures, and humidity.
3. Inspect for dents, scratches, or other damage. Replace damaged products.

1.8 WARRANTY

1. FMI shall be warranted against defects in materials and workmanship for a one-year period for the first 12 months after initial start-up or 18 months after ship date, whichever occurs first.

**PART 2 – PRODUCTS**

2.1 MANUFACTURERS

1. Basis of Design: Product specified is the PolarPlexTM Floor Mounted Infrastructure (FMI) as manufactured by Polargy, Inc. FMI specified is to establish a standard of quality for design, function, materials, and appearance.
2. Subject to compliance with this specification, the following Manufacturers may be proposed on the project:
   1. Polargy, Inc.
3. Substitutions: Proposed substitutions must be approved prior to bidding.

2.2 GENERAL

1. This floor mounted hot aisle/cold aisle containment and pathway system shall enclose two adjacent rows of equipment racks. The system is comprised of a steel frame that supports the containment panels, sliding doors, light fixtures, and cabling and power for the equipment racks. The system is floor mounted and is independent of the equipment racks. Rack gap panels, sealing materials and blanking panels are included as needed.

2.3 STRUCTURE

1. [System Architecture] The FMI framing system shall consist of tubular steel vertical support posts and an upper and lower set of horizontal beams with rigid bolted connections. The vertical support posts shall mount directly onto the slab floor and shall be spaced at 8’ to 12’ intervals. The framing system shall hold vertical containment panels between the upper and lower horizontal beams and support rack gap panels below the lower horizontal beams. The framing system shall support the aisle end sliding doors. Lastly, the framing system shall support the cable and power trays/pathways and lighting fixtures.
2. The FMI frame system will be designed so that the vertical panels and Rack Gap Panels can attach to it without interferences that create gaps.
3. The dimensions of the FMI framing system will be as indicated in the accompanying drawings.
4. The FMI shall be used to support the cable and power pathways and lighting fixtures. The entire system will the structurally engineered to support the weight of the system itself plus 100 lbs. per linear foot for the load of the cables, power and lighting.
5. Cable tray type and power pathways/busways will be defined in the accompanying drawings. Cable and power trays and lighting will be by others.
6. The FMI shall interface with the ceiling with flange pieces that attach to the top of the frame and extend through the plane of the ceiling so that ceiling deflection is accommodated.
7. The FMI vertical panels above the equipment racks shall be supported by aluminum tracks and shall tool-lessly install and remove to allow access to the cable trays from the contained side of the aisle. Vertical panels above the aisle end doors shall be fixed.
8. A 4” tall brush gasket shall seal the gap between the bottom of the lower horizontal beam and top of the equipment racks.
9. Rack Gap Panels shall have provisions for tool-lessly fastening to the FMI lower horizontal beam. Panels shall hook onto an attached support channel along the lower horizontal beam. Panel sizes and quantities shall be coordinated with the owner.
10. Vertical and Rack Gap Panels shall consist of 8mm twin-wall polycarbonate trimmed at the top with aluminum.
11. Sliding Doors shall have automatic closing with no threshold and include a mechanism for holding the door in an open position; the mechanism shall be removable without tools in order to accommodate sites where operators prefer to make this feature temporary.
12. Sliding Doors shall be adjustable in height to easily accommodate various height equipment racks and shall have an adjustment range to accommodate rack heights between 42U and 50U.
13. Sliding Doors shall have clear, twin-wall polycarbonate windows comprising over 75% of each door opening. Twinwall material shall be Class A fire-rated material. Twin-wall panel shall be field replaceable in order to easily swap out damaged inserts with a replacement time of less than 20 minutes to minimize disruption to containment.
14. Empty equipment racks shall be blanked off with 42U full length blanking panels. 42U-blanking panels shall install without tools using push rivets. 42U-blanking panels shall be printed with server images to give the appearance of a fully populated cabinet.
15. Miscellaneous gaps of shall be sealed with fire safe air dam foam or air dam barriers. Air dam foam shall be provided in 24”x24”x2” sheets that are pre-scored at 1” increments so that various sizes and shapes can be easily made. Air dam barriers shall be provided in various sizes and shall include magnetic or Velcro options for attaching the barriers to equipment racks.
16. All metallic components shall be bonded and grounded to the room grounding system per the National Electrical Code (NEC) and local Authority Having Jurisdiction (AHJ).

**PART 3 – EXECUTION**

3.1 PREPARATION

1. Slab floor thickness and quality for supporting the FMI will be by others and shall be structurally engineered to support the FMI.
2. Coordinate sequence of installation with owner and other trades.
3. Assure ceiling height is within allowable tolerances prior to start of installation.

3.2 INSTALLATION

1. Install FMI in accordance with manufacturer's shop drawings and written instructions.
2. Vertical support posts shall be installed directly to the slab floor. If the site includes a raised access floor, then the vertical support posts will pass through the access floor tiles and connect directly to the slab floor.
3. Doors must be secured to the framing system and to the floor.
4. Level and align doorframe prior to permanently fastening.
5. Fill and seal miscellaneous gaps with air dam foam or air dam barriers.
6. Installers shall provide appropriate installation hardware as defined by local code or the authority having jurisdiction (AHJ).

3.3 ADJUSTING AND CLEANING

1. Adjust doors for smooth operation, and, when closed, the door shall be centered on the aisle ends.
2. Clean entire FMI assembly with mild soap and water solution.

END OF SECTION