Polargy PolarPlexTM

Ceiling Supported 2-Tier Containment System

Hot/Cold Aisle Containment System Specification

**PART 1 - GENERAL**

* 1. SUMMARY
1. Ceiling Supported Aisle Containment System with Upper Tier (above rack) Vertical Panels and Lower Tier (rack level) Rack Gap Panels used for either Hot or Cold Aisle Containment.

	1. SYSTEM DESCRIPTION
2. Each HACS/CACS is to consist of an aisle containment plenum supported from the ceiling and independent of the equipment racks. Also, each HACS/CACS will have sliding doors supported from the containment plenum and independent of the server racks. Each HACS/CACS will include Rack Gap Panels supported from the containment plenum to fill empty rack spaces.

1.3 DESIGN REQUIREMENTS

1. Prefabrication and flat packaging of components in order to speed HACS/CACS staging and installation.
2. The HACS/CACS 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 fixture are not to be supported from the HACS/CACS.
4. In addition to the self-weight of the HACS/CACS, the HACS/CACS 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.
5. Each HACS/CACS shall be capable of accommodating 3” of total vertical movement (2” downward, 1” upward) at the interface between the HACS/CACS plenum and the top of the equipment racks.
6. Provide a sliding door at the end of each HACS/CACS. The sliding door should be a dual door, center opening type with auto-close and hold open features.
7. The HACS/CACS shall have the capability to remove 1 or more equipment racks from the continuous row without removal of the HACS/CACS to allow the entire exchange of a fully loaded equipment rack.
8. HACS/CACS Upper Tier Vertical Panels shall be moveable or removable to allow access to the cable trays from the contained side of the aisle.
9. Where equipment racks are not installed, each HACS/CACS shall include Rack Gap Panels and provisions to tool-lessly mount and remove them. The Rack Gap Panels shall accommodate the vertical movement noted above. Securing of Rack Gap Panels shall be to the HACS/CACS plenum structure.

1.4 PERFORMANCE REQUIREMENTS

1. The HACS/CACS 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 HACS/CACS 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 HAC/CAC 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 HACS/CACS: Dimensioned plans, elevations, sections, and details. Include floor plans showing dimensioned layout and support locations, type of support, and weight on each support.
	3. 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. HACS/CACS 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 PolarPlexTM HACS/CACS as manufactured by Polargy, Inc. HACS/CACS 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 hot aisle/cold aisle containment system shall enclose two adjacent rows of equipment racks. The system includes aisle end sliding doors at the ends of each aisle and an aisle containment plenum supported from the ceiling and independent of the equipment racks. Rack Gap Panels, sealing materials and blanking panels are included as needed.

2.3 STRUCTURE

1. [System Architecture] The aisle containment plenum shall be prefabricated in flat-packed sections that are lifted into place and secured to the ceiling. The plenum shall be supported from the ceiling structure and flush to the ceiling. Sliding doors shall attach to the plenum and floor and accommodate the lateral movement specified above. Rack Gap Panels shall secure to the plenum and also accommodate the lateral movement specified above.
2. The HACS/CACS plenum structural frame shall consist of pre-fabricated vertical and horizontal framing elements that hold the upper tier vertical panels.
3. HACS/CACS plenum Upper Tier Vertical Panels shall either slide in a track or be tool-lessly removable to allow access to the cable trays from the contained side of the aisle. Vertical panels above the aisle ends shall be fixed.
4. A 4” tall brush gasket shall seal the gap between the bottom of the plenum and top of the equipment racks.
5. Rack Gap Panels shall have provisions for tool-lessly fastening to the HACS/CACS plenum. Panels shall hook onto an embedded support channel along the bottom of the plenum and be captured at the floor with an F-bracket that accommodates the vertical movement noted above.
6. Rack Gap Panels shall consist of 8mm twin-wall polycarbonate trimmed at the top with aluminum. Panel sizes and quantities shall be coordinated with the owner.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.

**PART 3 – EXECUTION**

3.1 PREPARATION

1. Ceiling structure for supporting the HACS/CACS will be by others and shall be structurally engineered to support the HACS/CACS.
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 HACS/CACS in accordance with manufacturer's shop drawings and written instructions.
2. Doors must be secured to the framing system and to the floor.
3. Level and align doorframe prior to permanently fastening.
4. Fill and seal miscellaneous gaps with air dam foam or air dam barriers.
5. 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 HACS/CACS assembly with mild soap and water solution.

END OF SECTION