

**SECTION 05 45 23**  
**EQUIPMENT SUPPORT SYSTEM (Revised AD-2)**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Equipment and utility support structures constructed of slotted channel framing for support of utilities and OFOI equipment, where indicated on drawings.
- B. Cleanroom Ceiling Grid Support framing. Refer to Section 13 62 17, Cleanroom Ceiling System (CRCS).

**1.2 QUALITY ASSURANCE**

- A. Manufacturer shall have been active in metal framing business for at least five years and shall maintain quality assurance program that will permit manufacturer, if requested, to submit mill test reports for material furnished to assure that material meets specification criteria:
  - 1. Specifications for Design of Cold Formed Steel Structural Members: AISI.
  - 2. Manual of Steel Construction: AISC.
  - 3. Resistance welding: AWS-C1.1-66.
  - 4. Welding sheet steel in structures: AWS-D1.3-80.
- B. As a part of this work: Provide engineering design and calculations, performed and sealed by registered Engineer, licensed to practice Structural Engineering in the State of New York.
- C. Design criteria:
  - 1. Support structure: Building structure as indicated in the Structural Drawings.
  - 2. Universal grid system. Provide universal grid system with continuous support channels of spacing indicated in direction noted for each space. Locate first and last support channels 6 IN from inside face of walls parallel with universal grid direction. For equipment support systems requiring higher loadings, see Drawings. System to allow attachment of equipment support rails at any point without drilling or welding:

AD-2: Section 05 45 23: Revise paragraph 1.2.C.2.a.

- a. Maximum Spacing: 48 IN O.C.

AD-2: Section 05 45 23: Add paragraph 1.2.C.2.b.

- b. Provide minimum 3/4 IN concrete coverage as indicated.

- 3. Anchorage: Attach to structure by means of embedded concrete inserts or by direct attachment to structural framing. If expansion anchors are used to anchor metal framing to support structure locate in manner that anchor bolt is loaded in shear:
    - a. Expansion anchors in tension are not permitted.
    - b. Attach to ceiling system using threaded rods at 24 IN to 48 IN O.C.
  - 4. Design Loading:
    - a. Vertical: Design equipment support structure to support a minimum concentrated load of 400 LBS at any point.
    - b. Lateral: Design bracing for support structure to resist a lateral load equivalent to 2 percent of the Vertical Design Load.
  - 5. Safety factor: Design support structure for minimum safety factor of at least 3 based on ultimate strength under static loading conditions. Do not allow structure to deflect more than 1/720 span in either plane (vertical or horizontal) when maximal loading conditions, due to equipment operation, are applied.
- D. Allowable tolerances:
    - 1. Install supporting framework plumb and true.

2. Assure mounting surfaces of support structure are horizontal within 1/32 IN in 24 IN and within 1/16 IN in 18 FT length.
3. Elevation of one rail mounting surface to other within 1/16 IN in 24 IN length of rails.

### 1.3 SUBMITTALS

- A. Shop drawings:
  1. Indicate plan layout drawn to scale, typical elevations, anchoring methods.
  2. Indicate connections to Cleanroom Ceiling Grid.
  3. Indicate part numbers and attachment hardware.
- B. Product data:
  1. Catalog data: Properties of section, parts details.
- C. Project information:
  1. Address of nearest stocking dealer.
  2. Engineering design calculations (sealed by registered Engineer, licensed to practice Structural Engineering in the State where project is located).
- D. Environmental Information:
  1. LEED Credit MR 4.1 and 4.2, Recycled Content: Product data indicating percentages by weight of post-consumer and post-industrial recycled content for products having recycled content; include statement indicating costs for each product having recycled content.
  2. LEED Credit MR 5.1, Local/Regional Materials: Manufacturer's certification indicating final point of assembly for products and materials located within 500 miles of Project site. Include manufacturer's name, address and phone number.

### 1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in original sealed cartons with manufacturer's labels.

### 1.5 JOB CONDITIONS

- A. Field measurements:
  1. Take field measurements to assure support system can be installed without interference with structural framing, mechanical systems, plumbing, or other obstructions.
  2. Report major interferences to Architect.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Acceptable manufacturers:
  1. Equipment Support System:
    - a. Base:
      - 1) Unistrut:
        - a) Part numbers shown in this specification and on drawings are for Unistrut parts. Equivalent parts provided by Optional Manufacturers listed below are acceptable.
    - b. Optional:
      - 1) B-Line.
      - 2) Hilti.
      - 3) Thomas and Betts, Superstrut.
- B. Framing material: ASTM-A1011 Grade-33 or ASTM-A1008 Grade-A, G90.
- C. Finish at Ceiling Grid Supports (all areas except Clean Zone):
  1. Framing members and fittings: Galvanized per ASTM-A123, ASTM-A153, G90.
  2. Hardware: Electrogalvanized, ASTM-B633 Type-3-SC1.

- D. Finish at laboratories – exposed: Powder coated (white) on all framing member.
- E. Finish at Clean Zone Cleanroom Ceiling Grid Support:
  - 1. The ‘Clean Zone’ is the area where all air-management system ventilation is designated ‘clean’.
  - 2. Framing members and fittings: Perma-Gold zinc galvanized finish.
  - 3. End caps and frame caps: Provide end caps Unistrut P2859 on the end of all cut struts.
- F. Bracing: Provide bracing to resist lateral loads where framing is suspended more than 12 IN from ceiling or structure.
- G. Accessories:
  - 1. Provide fittings, fasteners, clamps, and miscellaneous items to provide a complete and secure installation:
    - a. Provide part numbers indicated on drawings where shown. Finish to match framing members.
  - 2. Provide channel covers at exposed surfaces after supports are installed:
    - a. Channel covers: Unistrut P3184F.
  - 3. Finish on all accessories shall match finish on framing system members as indicated above.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Report modification of installation required by coordination with trades and other supports to Architect.
- B. Install equipment support structure in accordance with approved shop drawings.
- C. Install equipment support system in Clean Zone, aligned with ceiling grid system.
- D. Install under supervision of manufacturer.

**END OF SECTION**