

SECTION 09 54 00 SPECIALTY CEILINGS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Section Includes: Extruded aluminum suspended ceiling grid system including:
 - 1. Aluminum ceiling grid.
 - 2. Grid connectors and fasteners.
 - 3. Wall angle and edge trim.

- B. Drawings, General and Supplementary Conditions, Division 00 Procurement and Contracting Requirements, and Division 01 Specifications sections apply to this Section.

1.2 RELATED SECTIONS

- A. Use this Section in conjunction with the following other specifications and related Contract Documents to establish the total requirements for Data Center Structural Ceiling Grid System:
 - 1. Section 05 43 00 – Slotted Channel Framing: metal framing components for placement by this Section.
 - 2. Section 21 13 00 – Fire-Suppression Sprinkler Systems: wet-pipe, dry-pipe, and pre-action as it relates to this Section.
 - 3. Section 26 05 36 – Cable Trays for Electrical Systems.
 - 4. Section 26 25 00 – Low-Voltage Enclosed Bus Assemblies.
 - 5. Section 26 50 00 – Lighting.
 - 6. Section 28 31 51 – Fire Alarm System.
 - 7. Section 28 31 52 – Early Warning Smoke Detection.

- B. CAUTION: Use of this Section without including the above listed items results in omission of basic requirements.

- C. In the event of conflict regarding rough carpentry requirements between this Section and another section, the provisions of this Section govern.

1.3 REFERENCES

- A. Aluminum Association (AA):
 - 1. International Alloy Designations and Chemical Composition Limits for Wrought Aluminum and Wrought Aluminum Alloys.
- B. ASTM International (ASTM):
 - 1. ASTM E1264 – Standard Classification of Ceiling Products.
- C. International Code Council (ICC):
 - 1. 2018 International Building Code (IBC).

1.4 SYSTEM DESCRIPTION

- A. A heavy-duty suspended ceiling system consisting of T-shaped extruded aluminum main runners and cross tees fastened together to form a rectangular grid that is supported by the building structure using threaded rods.
- B. Grid components include a continuous screw boss on the underside of the grid to allow support of the following items:
 - 1. Utility racks consisting of framing components specified in Section 05 43 00 – Slotted Channel Framing.
 - 2. Hot/Cold aisle enclosure partitions as specified within Section 13 21 00 – Controlled Environment Rooms.
 - 3. Fire sprinklers as specified in Section 21 13 00 – Fire-Suppression Sprinkler Systems: wet-pipe, dry-pipe, and pre-action.
 - 4. Cable trays as specified in Section 26 05 36 – Cable Trays for Electrical Systems.
 - 5. Enclosed bus assemblies as specified in Section 26 25 00 – Low-Voltage Enclosed Bus Assemblies.
 - 6. Light fixtures as specified in Section 26 50 00 – Lighting.
 - 7. Early warning detection system as specified in Section 28 31 52 – Early Warning Smoke Detection.
- C. Grid is filled in with ceiling panels, unless indicated otherwise.

1.5 PERFORMANCE REQUIREMENTS

- A. Load capacities defined based on Allowable Moment of Controlling Member using standard structural engineering calculations off of the grid member's Moment of Inertia.
- B. Structural capability with a 4' x 6' suspended grid as follows:
 - 1. Uniform load of up to 40 lbs/ft².
 - 2. Maximum static point load of 500 lbs.
 - 3. Threaded screw slot pull-out load of 1050 lbs. or higher
 - 4. Deflection at maximum static point load of L/200 or better.
- C. Structural capability with a 4' x 4' suspended grid as follows:
 - 1. Uniform load of up to 95 lbs/ft².
 - 2. Maximum static point load of 750 lbs.
 - 3. Threaded screw slot pull-out load of 1050 lbs. or higher
 - 4. Deflection at maximum static point load of L/250 or better.
- D. For seismic zones the grid connectors must provide an Allowable Lateral Load parallel to open channel slot of at least 700 lbs.

1.6 SUBMITTALS

- A. Proposal Submittals:
 - 1. Performance Data provide:
 - a. Maximum static point load at midspan of 4' span
 - b. Midspan Deflection at Maximum Point Load for 4' span
 - c. Point Load associated with a deflection of L/180 on 4' span
 - d. Maximum static point load at midspan of 6' span
 - e. Midspan Deflection at Maximum Point Load for 6' span
 - f. Point Load associated with a deflection of L/180 on 6' span
 - g. Structural Analysis of Grid Member to include Moments of Inertia, Allowable Shear, and Allowable Moment.
 - 2. Product Data: Submit manufacturer's written specification sheets, installation instructions, and material characteristics for manufactured products and accessories.
 - 3. Shop Drawings: Dimensioned plans, elevations, layout of components, connection details, and interface with other building construction.
- B. Action Submittals
 - 1. Manufacturer's Installation Instructions: Submit detailed instructions illustrating sequence of installation and coordination with other installation activities.
 - 2. Include a schedule of the time required for manufacturing, onsite final fabrication, and installation.

- C. Closeout Submittals
 - 1. Final Shop Drawings: If as-built drawings are substantially different from original drawings.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 3 years producing types of products specified.
- B. Installer Qualifications: Minimum 5 years specializing in performing work of this section and that is approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Accept ceiling system components onsite in manufacturer's original containers. Inspect for damage.
- B. Store materials and products in strict compliance with manufacturer's instructions and industry standards. Protect components from damage during handling and installation.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Acclimatize ceiling system components to ambient conditions of installation area for 24 hours prior to start of installation.
- B. Maintain interior design temperatures during and after installation of ceiling system.

1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.11 SEQUENCING AND SCHEDULING

- A. Sequence work in order to not conflict with work of other trades.
- B. Convene a minimum two weeks prior to commencing work of this Section.

1.12 COORDINATION

- A. Coordinate the design of the ceiling grid system with other building systems indicated on the architectural, structural mechanical, electrical, and telecom drawings.

- B. Coordinate the installation of the ceiling grid system with all other trades that will perform work in or on the ceiling system including electrical wiring and light fixtures, HVAC equipment or ductwork, sprinkler systems, and hot/cold aisle containment systems.

1.13 WARRANTY

- A. The warranty specified in the Section does not deprive the Owner of rights under other provisions of the Contract and shall be in addition to, and run concurrent with, other warranties made by the manufacturer under requirements of the Contract.
- B. Repair or replace components that fail in materials or workmanship within specified warranty period. Include labor, material, and related expenses to restore system and/or components from failures.
- C. Warranty Period: One year after completion of startup and integrated commissioning and/or Contract, unless stated otherwise.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Product specified is PICS™ Structural Ceiling Grid System as manufactured by Polargy, Inc. PICS™ is specified to establish a standard of quality for design, function, materials, and appearance.
- B. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified:
 - 1. Ceiling Grid:
 - a. Polargy, Inc.
800 W. El Camino Real, Suite 180
Mountain View, CA 94040 U.S.A.
Phone: (888) 816-8338
 - b. Other Owner-approved manufacturer.
- C. Substitutions: Proposed substitutions must be approved prior to bidding.

2.2 COMPONENTS

- A. Ceiling Grid: extruded aluminum, alloy 6005A, temper T61 with a 204-R1 clear, anodized finish. Grid profile shall be an inverted T-shape with a continuous integral 3/8"-16 threaded boss feature along the bottom for the attachment of intersection connectors at any point to facilitate ease of field installation.

1. Typical Configuration:
 - a. 4' x 6' building structure (Note: 3/8"-16 or 1/2"-13 threaded rod between building structure, or intermediate steel, and the bottom PICS™ connector is by the installing contractor).
 2. High Capacity Configuration
 - a. 4' x 4' building structure (Note: 3/8"-16 or 1/2"-13 threaded rod between building structure, or intermediate steel, and the bottom PICS™ plate connector is by the installing contractor).
- B. Main Runners and Cross Tees: common extrusion, inverted T-shaped, 6-foot long main runner and 4-foot long cross tee nominal lengths with continuous screw slot thread boss feature on the bottom side of T to allow direct attachment of cable trays, utility racks, partition wall system head tracks, surface-mounted lighting fixtures, hot/cold aisle containment, soft-wall curtain tracks, or other accessories.
1. Grid face: 1.55" wide, with a continuous 3/8"-16 screw boss centered in grid face that is at least 0.4" deep.
 2. Main runners and cross tees shall be sized and spaced to accommodate either a 24", 48", or wider on center layout to accept standard sized ceiling tiles and fixtures.
- C. PICS™ Connectors:
1. Heavy-duty steel plate connectors shall be used at all intersections to join the grid system together via 3/8"-16 threaded rods. Four (4) 3/8"-16 x 3/4" long hex tap bolts shall be used to fasten the connectors to the extruded aluminum grid members.
- D. Wall Angle
1. An aluminum 1-1/2" x 1-1/2" x 1/8" thick L-angle extrusion that will encompass the perimeter of the ceiling grid system at the predetermined ceiling height. Appropriate wall type fasteners will be used to fasten the wall angle to the building walls. Brackets will be used to fasten the wall angle to the PICS™ Tees in a fixed perimeter installation only.
- E. Edge Trim
1. An aluminum 3/4" x 3/4" x 1/16" thick L-angle extrusion that will fill all perimeter gaps between PICS™ Tees in a fixed perimeter installation only. Edge trim shall be adhered to the wall angle forming a U-shape and be used for panel support around the perimeter of the ceiling grid system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify ceiling support rod anchors are properly installed in structure above.

3.2 INSTALLATION

A. General:

1. Install work in accordance with manufacturer's reviewed shop drawings and written installation instructions.
2. Coordinate work with other trades to be performed in or on ceiling systems, including, but not limited to, HVAC, low voltage, electrical, partition and privacy wall systems, and aisle containment systems.
3. Installers shall provide appropriate installation hardware as defined by local code or the Authority Having Jurisdiction (AHJ).

B. Perimeter Installation

1. Fixed Perimeter Installation: Mount Perimeter Wall Angle at proper ceiling height. Wall Angle shall be fastened to perimeter wall with appropriate wall type fasteners. Joints shall fit with no more than .0625" gaps. Main Tees and Cross Tees shall rest on top of Wall Angle and be attached with fixed brackets. Edge Trim will run along and be adhered to wall angle forming a U-shape for ceiling tile support.
2. Floating Perimeter Installation: Mount Perimeter Wall Angle at proper ceiling height. Wall Angle shall be fastened to perimeter wall with appropriate wall type fasteners. Joints shall fit with no more than .0625" gaps. Wall Angle shall rest on top of the Main Tees and Cross Tees ceiling panel flats creating an airtight seal while still allowing for growth.

C. Grid Installation

1. Structural Ceiling Grid shall be deployed as a nominal 2' x 4' grid supported with nominal spacing of 4' x 6' connections to building structure.
2. 72" Main Runners shall be installed on 48" centers and all main runners shall be parallel to one another. 48" Cross Tees shall be installed perpendicular to Main Runners at 24" spacing.
3. Attach threaded rod, previously hung by others from steel structure, to PICS™ connectors on grid using required hardware.
4. Level entire ceiling to specified erection tolerances.
5. Brace grid for seismic conditions when required by local code.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Level (over entire ceiling area): 0.125-inch.
- B. Maximum Variation from Level (in a 6-foot length in any direction): 0.06-inch.

3.4 FIELD QUALITY CONTROL

- A. Inspect for air leaks, loose and missing fasteners, and improperly installed components.
- B. Repair or replace damaged components.

3.5 CLEANING

- A. Inspect above and below installed ceiling system. Remove paint splatters and other spots, dirt, and debris. Touch-up scratches and mars of finish to match original finish.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

3.7 SCHEDULE

- A. See the Drawings for locations of ceiling grid system.

END OF SECTION