

# DG 3.0M STRUCTURAL HIGH CAPACITY DATA CENTER CEILING GRID

## SECTION 09 54 00

### PART 1 – GENERAL

#### 1.01 SECTION INCLUDES:

- A. Section includes:
  - 1. Acoustical and Non-Acoustical Ceiling Panels
  - 2. Exposed Grid Suspension System
  - 3. Threaded Rod and Turnbuckle, fasteners, Main Runners, Cross Tees, and Wall Angle Moldings
  - 4. Perimeter Trim
  - 5. LED Light Panels
- B. Related sections:
  - 1. Section 09 51 00 – Acoustical Ceilings
  - 2. Section 09 51 13 – Acoustical Fabric-Faced Panel Ceilings
  - 3. Section 09 53 00 – Acoustical Ceiling Suspension Assemblies
  - 4. Section 09 20 00 – Plaster and Gypsum Board
  - 5. Section 02 42 00 – Removal and Salvage of Construction Materials
  - 6. Divisions 23 – HVAC Air Distribution
  - 7. Division 26 - Electrical

#### 1.02 RELATED DOCUMENTS/SECTIONS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Division 1 Specification sections apply to work of this Section.
- C. Finish Schedule or Finish Legend applies to work of this Section.

#### 1.03 REFERENCES:

- A. GENERAL
  - 1. Comply with applicable requirements of the following, except where more stringent requirements are indicated by Building Codes.
- B. ASTM (American Society for Testing and Materials)
  - 1. ASTM C423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - 2. ASTM C635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
  - 3. ASTM C636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
  - 4. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
  - 5. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials

- 6. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Material
- 7. ASTM E580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
- 8. Aluminum Standards and Data by The Aluminum Association
- C. International Building Code
- D. ASHRAE Standard 62.1-2004 Ventilation for Acceptable Indoor Air Quality
- E. NFPA 70 National Electrical Code
- F. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
- G. LEED – Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

**1.04 DESIGN/PERFORMANCE REQUIREMENTS:**

- A. All components of the DG 3.0M Structural High Capacity Data Center Ceiling Grid shall be provided by one (1) Manufacturer to ensure single source responsibility and quality control.

**1.05 SUBMITTALS:**

- A. Refer to Section 013000 Administrative Requirements Submittal Procedures
- B. Product Data: Submit Manufacturer's:
  - 1. Product Specifications
  - 2. Catalogues
  - 3. Technical Product Data
  - 4. Certifications
  - 5. Standard Details
  - 6. Installation Recommendations
- C. Shop Drawings: Layout and details of ceilings show locations of items that are to be coordinated with, or supported by the ceilings.
- D. Samples:
  - 1. Minimum 6 inch x 6 inch samples of specified Acoustical Panel
  - 2. Samples of exposed Wall Molding and Suspension System, including Main Runner and Cross Tees
- E. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
- F. PE Calculations: Provide project specific professional engineer calculations for seismic and load requirements by a licensed PE in the state the project is located.

**1.06 QUALITY ASSURANCE:**

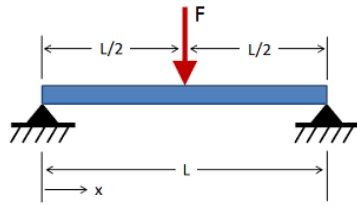
- A. Single-Source Responsibility: Provide Panel Units and Grid Components by a single Manufacturer.
- B. Fire Performance Characteristics:
  - 1. Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1263 Classification.
- C. Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate

the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and Installers are advised to consult a fire protection engineer, NFPA 13, or their Local Codes for guidance where automatic fire detection and suppression systems are present.

D. Performance: Ceiling System shall have a flush, finished ceiling surface for flush attachment of Wall Systems and other devices. Completed Ceiling System shall be capable of providing structural connection and/or direct suspension of systems such as cable trays and other utilities, partition head-tracks, and containment barriers as required and indicated for area installed.

E. Structural:

1. Maximum Static Loads at midpoint are calculated using the following formula for a Simply Supported, Center Load:



i.

$$\delta_{max} = \frac{FL^3}{48EI} \quad @ x = L/2$$

- ii.
2. Capable of a maximum static point load at midpoint between 1200 mm suspension tee hangers of 109 kg (1,069 N) at L/360 (3.33 mm) deflection.
  3. Capable of a maximum static point load at midpoint between 4' suspension tee hangers of 220 kg (2,157 N) at L/180 (6.67 mm) deflection.
  4. Capable of a maximum static point load of 634 kg (6,217 N) with heavy duty connector in line with Turnbuckle connection to a building structure.
  5. Turnbuckle connection shall be capable of a maximum point load connection to building structure of 634 kg (6,217 N).

### 1.07 **PRODUCT DELIVERY, STORAGE AND HANDLING:**

- A. Deliver Ceiling Units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing Ceiling Units, permit them to reach room temperature and stable moisture content.
- C. Handle Ceiling Units carefully to avoid chipping edges or damaging the units in any way.

### 1.08 **PROJECT CONDITIONS:**

- A. Coordination of Work: Coordinate ceiling work with Installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

### 1.09 **SEQUENCING:**

- A. Ensure that locating templates and other information required for installation of products of this Section are furnished to affected trades in time to prevent interruption of construction progress.

- B. Ensure that products of this Section are supplied to affected trades in time to prevent interruption of construction process.

#### **1.10 WARRANTY:**

- A. Suspension: Submit a written Warranty executed by the Manufacturer, agreeing to repair or replace Panels that fail within the Warranty Period. Failures include, but are not limited to the following:
  - 1. Ceiling System: Manufacturer's defects
- B. Warranty Period:
  - 1. Ceiling System: One (1) year from date of shipment
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other Warranties made by the Contractor under the requirements of the Contract Documents.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURERS:**

- A. Acceptable System: Subject to compliance with requirements, furnish and install DG 3.0M Structural High Capacity Data Center Ceiling Grid as a single source by Gordon, Inc. For all inquiries contact, Gordon, Inc., 5023 Hazel Jones Road, Bossier City, LA 71111, (800) 747-8954.
- B. Alternates:
  - 1. Prior Approval: Unless otherwise provided for in the Contract Documents, proposed product substitutions may be submitted no later than ten (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.
  - 2. Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to the following: Single source materials supplier; Panel design, size, composition, color, and finish; Suspension System component profiles and sizes; compliance with the referenced standards.

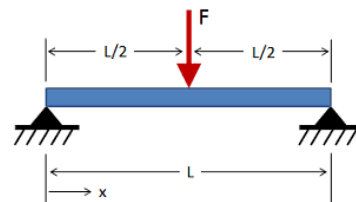
#### **2.02 DG 3.0M GRID SYSTEM:**

- A. DG 3.0M High Capacity Data Center Ceiling Grid and Suspension Components:
  - 1. DG 3.0M High Capacity Data Center Grid – The Grid System shall be manufactured of extruded aluminum alloy 6060, temper T66 with a 204-R1 etched and clear anodized finish. Grid profile shall have a 38.1 mm wide face and 60.3 mm web with a continuous integral thread boss within the web for attachment of intersection connectors at any point along the top of the Grid Members, and to facilitate ease of field installation.

2. 3,600 mm Main Runners and 1,200 mm (nominal length) Cross Tees shall have a continuous M10-1.5 ScrewSlot thread boss feature to allow direct attachment of cable trays, utility racks, partition wall system head tracks, surface-mounted lighting fixtures, slot-wall curtain tracks or other accessories.
3. Suspension System:
  - a. Model G-38 Grid Connectors – Heavy duty zinc alloy casting connectors shall be used at Grid intersections and to suspend the Grid System via M10-1.5 Threaded Rods. M6-1 Philips drive button head cap screws are used to fasten the connectors to the extruded aluminum Grid Members.
  - b. M10-1.5 Threaded Starter Rod and Turnbuckle – ASTM rated RH/LH, 203 mm long, zinc plated, M10-1.5 Threaded Rod and 152 mm body zinc plated steel Turnbuckle spaced at 1,200 mm centers along the Main Runners, for a 1,200 mm x 1,200 mm nominal suspension from building structure. (Note: M10-1.5 all-thread between building structure or intermediate steel and Manufacturer-furnished Turnbuckle is by the installing Contractor).

4. Structural:

- a. Ceiling System with 1,200 mm x 1,200 mm Suspension, shall be capable of supporting a fully populated Ceiling Grid, including blank Panels, HVAC supply and return registers, and light fixtures, plus directly supporting cable trays, utility racks, and other accessories.
- b. Structural:
  - i. Maximum Static Loads at midpoint are calculated using the following formula for a Simply Supported, Center Load:



a)

$$\delta_{max} = \frac{FL^3}{48EI} \quad @ x = L/2$$

b)

- ii. Capable of a maximum static point load at midpoint between 1200 mm suspension tee hangers of 109 kg (1,069 N) at L/360 (3.33 mm) deflection.
- iii. Capable of a maximum static point load at midpoint between 4' suspension tee hangers of 220 kg (2,157 N) at L/180 (6.67 mm) deflection.
- iv. Capable of a maximum static point load of 634 kg (6,217 N) with heavy duty connector in line with Turnbuckle connection to a building structure.
- v. Turnbuckle connection shall be capable of a maximum point load connection to building structure of 634 kg (6,217 N).
- c. Contact Manufacturer for job-specific load requirements.

## B. Optional Accessories:

### 1. Lay-In Ceiling Panels

#### a. Acoustical Ceiling Panels:

- i. Mineral wool tile, fleece-covered
- ii. Colors: White (Standard) or Black (Special Order)
- iii. Nominal 600 mm x 600 mm and 600 mm x 1,200 mm module sizes
- iv. Thickness: 19 mm nominal
- v. Sound Reduction: 33 dB, CAC35 dB, NRC 0.80
- vi. Fire Resistance:
  - a) Class 1 (ASTM E84-97a)
  - b) Class A (ASTM E1264)
  - c) CAN/ULC-S102
  - d) A2-s1, d0 (EN 13501-1)
- vii. Light Reflectance: Approximately 87 (ISO 7724-2, ISO 7724-3)
- viii. Humidity Resistance: Up to 95% RH
- ix. Mold Resistance: According to ASTM D3272

#### b. DataVENT Aluminum Eggcrate Panels:

- i. Cell Size: 13 mm x 13 mm; Panel height is 13 mm; 92% open area
- ii. Nominal 600 mm x 600 mm and 600 mm x 1,200 mm and 1,200 mm x 1,200 mm module sizes
- iii. Color: White (Standard) or Black (Special Order) Powder Coat

#### c. Flat Metal Panels:

- i. Perforated or Non-Perforated (Many perforation patterns available)
- ii. Nominal 600 mm x 600 mm and 600 mm x 1,200 mm module sizes
- iii. Color: White (Standard) Powder Coat

#### d. Aluminum Honeycomb Core Panels:

- i. Nominal 600 mm x 1,200 mm and 1,200 mm x 1,200 mm and 600 mm x 600 mm
- ii. Thickness: 6.35 mm
- iii. Top and Face Plates: Aluminum alloy 5052-H32, 0.813 mm thick
- iv. Core: Aluminum Honeycomb, 19 mm cell size, DURA-core, 3.0-1/2-0.003
- v. Finish: Polar White
- vi. Weight: Approximately 5.37 kg/m<sup>2</sup>

### 2. DataLUME LED Light Panels:

- a. Nominal 600 mm x 600 mm and 600 mm x 1,200 mm module sizes
- b. Panel frame is extruded aluminum, painted white
- c. Wattage: 50W (600 mm x 1,200 mm); 40W (600 mm x 600 mm)
- d. Color Temperature (CCT): 5000K

- e. Nominal Lumens Delivered: 5000 lm (600 mm x 1,200 mm); 4000 lm (600 mm x 600 mm)
- f. Efficacy (LM/W): 100 lm/w
- g. CRI: 90
- h. Input Voltage: 100V-277V 50/60Hz

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION:**

- A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering, and painting has been completed and thoroughly dried out, unless expressly permitted by Manufacturer's printed recommendations.

### **3.02 PREPARATION:**

- A. Measure each ceiling area and establish layout of modules to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate Panel layout with mechanical and electrical fixtures.
- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

### **3.03 INSTALLATION:**

- A. Perimeter Installation
  - 1. "Fixed" Perimeter Option: Position Wall Angle at proper ceiling height on center of wall using a laser leveling device and attach with fasteners appropriate for existing wall type. Continue installing toward the corners and then around the room until complete. Corner can be field cut with a power miter saw using a non-ferrous, carbide tipped blade. All joints must fit tight with no gaps.
  - 2. "Floating" Perimeter Option: Perimeter closure angles, if required, shall be affixed to the perimeter walls with fasteners appropriate for existing wall type, using a laser leveling device. Perimeter Main Tee extrusions shall be suspended from structure at the proper ceiling height and using a laser leveling device, beginning at the center of the room. Continue installing toward the corners and then around the room until complete. Corner can be field cut with a power miter saw using a non-ferrous, carbide tipped blade. All joints must fit tight with no gaps.
- B. Grid Installation
  - 1. Position Main Tees at 1,200 mm or as required, perpendicular to Wall Angle. Attach threaded rod previously hung by others from steel structure to Turnbuckle and Rod attached to connectors on Grid.
  - 2. Level entire ceiling to within 3 mm overall and/or 1.5 mm in any 3,050 mm length.
  - 3. Brace Grid for seismic conditions when required by Local Code.
- C. Installation General

1. Coordinate all work with other trades to be performed in or on Ceiling System including light fixtures, HVAC equipment, sprinkler systems, and wall partition systems.

**3.04 CLEANING:**

- A. Follow Manufacturer's cleaning instructions for specified finish.

**3.05 PROTECTION:**

- A. Institute protective measures required throughout the remainder of the construction period to ensure that DG 3.0M Grid System will be without damage or deterioration at time of acceptance.

**END OF SECTION**