SECTION 095436 - SUSPENDED DECORATIVE GRIDS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. SUMMARY
				1. Section includes rigid, open-frame, suspended grids and suspension systems for ceilings.
			2. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.

If needed, insert list of conference participants.

* + - 1. SUBMITTALS
				1. General: Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.
				5. Sustainable Design Submittals:

Retain "Samples" paragraph below for single-stage Samples, with a subordinate list if applicable. Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs for two-stage Samples.

* + - * 1. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
				2. Samples for Initial Selection: For units with factory-applied finishes.
				3. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

Cell Grids: Set of [**full-size**] [**12-inch- square**] module Samples of each type, finish, and color.

Beam Grids: Set of 12-inch- long Samples of each type, finish, and color; a 12-inch- long spliced section; and a 6-inch- long per leg corner section.

Retain "Delegated-Design Submittal" paragraph below if design services have been delegated to Contractor.

* + - * 1. Delegated-Design Submittal: For design of [**seismic restraints and**]attachment devices.

Retain "Coordination Drawings" paragraph below for situations where limited space necessitates maximum utilization for efficient installation of different components or if coordination is required for installation of products and materials by separate installers. Coordinate paragraph with other Sections specifying products listed below. Preparation of coordination drawings requires the participation of each trade involved in installations within the limited space.

* + - * 1. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

Lighting fixtures.

Air outlets and inlets.

Speakers.

Sprinklers.

Retain "Field quality-control reports" paragraph below if Contractor is responsible for field quality-control testing and inspecting.

Retain the paragraph below only when fastening to concrete decks.

* + - * 1. Field quality-control reports.
			1. CLOSEOUT SUBMITTALS
				1. Maintenance Data: For finishes to include in maintenance manuals.
			2. MAINTENANCE MATERIAL SUBMITTALS
				1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

Revise "Suspended Decorative Grids" subparagraph below to suit Project. If preferred, replace percentage with a specific number of suspended decorative grid components and their lengths.

Suspended Decorative Grids: Quantity of each suspended decorative grid component, exposed molding, and trim equal to 2 percent of quantity installed.

* + - 1. QUALITY ASSURANCE
				1. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

Indicate portion of ceiling represented by mockup on Drawings or draw mockup as separate element.

Build mockup of typical ceiling area as shown on Drawings.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Deliver suspended decorative grid components to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
				2. Handle suspended decorative grids and accessories to avoid damaging units and finishes.
1. PRODUCTS

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. PERFORMANCE REQUIREMENTS

Retain "Delegated Design" paragraph below if Contractor is required to assume responsibility for design.

* + - * 1. Delegated Design: Engage a qualified professional engineer, licensed in the State of New York, to design [**seismic restraints and**]attachment devices.
				2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Flame-Spread Index: 25 or less.

Smoke-Developed Index: 450 or less.

* + - 1. SUSPENDED DECORATIVE GRIDS, GENERAL
				1. Sheet Metal: Selected for surface flatness, smoothness, and freedom from surface blemishes where exposed to view in finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet, stains, discolorations, or other imperfections.

Factory-assembled modules are typically more costly, are size limited, and are not available from all manufacturers because most manufacturers design lineal components to be site fabricated. Site-assembled cells are easier and less costly to ship, but they require more time and labor to install.

* + - * 1. Grid Fabrication: Components are formed from metal indicated. Manufacturer's standard units of size, shape, and profile indicated; finished to comply with requirements indicated.[**Provide cells factory assembled into modular panel.**]
				2. Cover Profiles and Trim: Provide manufacturer's standard cover profiles and trim for exposed members, and as indicated or required, for edges of grids, at changes in ceiling height, and for other conditions, of same metal and finish as suspended decorative grids.
				3. Metal Suspension-System Standard: Provide ceiling manufacturer's standard metal suspension systems of types and finishes indicated that comply with applicable ASTM C635 requirements. Provide systems complete with runners or beams, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, web covers, load-resisting struts, fixture filler pans, clips and adapters, and other suspension components required to support ceiling units and other ceiling-supported construction.
				4. Attachment Devices: Size for 5 times the design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.

Retain "Expansion Anchors" subparagraph below if expansion anchors are acceptable. Verify safety factor with Project's structural engineer. Insert specific load requirements and names of acceptable products if required.

Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318, greater than or equal to the design load, as determined by testing per ASTM E488 conducted by a qualified testing agency.

Design Consultant to review code references and verify that the referenced sections/tables are current. Note that code references shall be based on the current version of the Uniform Code.

Retain "Power-Actuated Anchors" subparagraph below if power-actuated fasteners are acceptable. Verify safety factor with Project's structural engineer.

Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E1190 conducted by a qualified testing agency.

Design Consultant to review code references and verify that the referenced sections/tables are current. Note that code references shall be based on the current version of the Uniform Code.

* + - * 1. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

Zinc-Coated, Carbon-Steel Wire: ASTM A641, Class 1 zinc coating, soft temper.

Retain second option in "Size" subparagraph below if required by authorities having jurisdiction or if required for extra security and quality (including corrosion allowance). Because larger sizes are difficult to work with, their use could result in poor leveling tolerance.

Size: Select wire diameter so its stress at 3 times hanger design load indicated in ASTM C635, Table 1, Direct Hung, is less than yield stress of wire, but provide not less than 0.106-inch (12 ga) - diameter wire.

If retaining "(Hanger Rods) (Flat Hangers)" paragraph below, indicate sizes on Drawings or insert to suit Project.

* + - * 1. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

If retaining "Angle Hangers" paragraph below, revise minimum size to suit Project or indicate sizes on Drawings.

* + - * 1. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch (20 ga) - thick, galvanized-steel sheet complying with ASTM A653, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

Retain "Seismic Struts" paragraph below if required. Coordinate with manufacturer's requirements and authorities having jurisdiction.

* + - * 1. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
				2. Exposed Metal Edge Moldings, Covers, Trim, and Fixture Filler Panels: Provide exposed members as indicated or required to conceal edges of and penetrations through ceiling, to conceal edges of beams, to cover runner webs, for fixture trim and adapters, for fasciae at changes in ceiling height, and for other conditions; of metal and finish matching suspended decorative grids unless otherwise indicated.

For Circular Penetrations of Ceiling: Fabricate edge moldings to diameter required to fit penetration exactly.

"Aluminum Grid Units for Suspended Decorative Grids" and "Steel Grid Units for Suspended Decorative Grids" articles below are examples of suspended decorative grids. Revise to suit Project.

* + - 1. ALUMINUM GRID UNITS FOR SUSPENDED DECORATIVE GRIDS <**Insert drawing designation**>

If applicable, copy this article and re-edit for each product.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=363) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Armstrong World Industries, Inc](http://www.specagent.com/Lookup?uid=123457059472).

Certainteed; A Saint Gobain Company.

[USG Corporation](http://www.specagent.com/Lookup?uid=123457100746).

Approved equivalent.

* + - * 1. Aluminum Sheet: Roll-formed aluminum sheet, complying with ASTM B209; alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

Sheet Metal Thickness: Not less than [**0.016 inch**] [**0.018 inch**] [**0.020 inch**] [**0.024 inch**] [**0.032 inch**].

Retain "Beam Grid Module" and "Beam Width by Height" paragraphs below if required.

* + - * 1. Beam Grid Module: [**8 inches square**] [**12 inches square**] [**18 inches square**] [**24 inches square**] [**30 inches square**] [**36 inches square**] [**48 inches square**] [**24 by 48 inches**] [**As indicated on Drawings**].
				2. Beam Width by Height: [**2 by 2 inches**] [**2 by 4 inches**] [**3 by 3 inches**] [**4 by 4 inches**] [**As indicated on Drawings**] <**Insert dimensions**>.

Retain "Cell Panel Module" paragraph below if required.

* + - * 1. Cell Panel Module: [**24 inches square**] [**24 by 48 inches**] [**As indicated on Drawings**] [**Manufacturer's standard**].
				2. Cell Module: [**2 inches square**] [**3 inches square**] [**4 inches square**] [**6 inches square**] [**8 inches square**] [**12 inches square**] [**As indicated on Drawings**].

Retain "Cell Profile, Width by Height" paragraph below if required.

* + - * 1. Cell Profile, Width by Height: [**3/8 by 2 inches**] [**3/8 by 4 inches**] [**9/16 by 2 inches**] [**As indicated on Drawings**].
				2. Finish: [**Lacquered mill**] [**Clear anodized**] [**Clear mirror anodized**] [**Painted to match color indicated by product designation**] [**Painted to match Director’s Representative's sample**] [**Painted in color selected from manufacturer's full range**] [**Bright-reflective metallic finish selected from manufacturer's full range**].
			1. STEEL GRID UNITS FOR SUSPENDED DECORATIVE GRIDS <**Insert drawing designation**>

If applicable, copy this article and re-edit for each product.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=364) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Armstrong World Industries, Inc](http://www.specagent.com/Lookup?uid=123457059478).

Certainteed; A Saint Gobain Company.

[USG Corporation](http://www.specagent.com/Lookup?uid=123457059476).

Approved equivalent.

* + - * 1. Steel Sheet: Commercial-quality, cold-rolled, carbon-steel sheet; stretcher leveled; with protective coating complying with ASTM C635.

Retain "Painted Finishes" or "Chemical/Mechanical Finishes" subparagraph below for painted finishes. Verify, with manufacturers, availability of protective coatings and finishes and revise to suit Project.

Painted Finishes: Electrolytic zinc-coated steel complying with ASTM A879, 04Z coating, surface treatment as recommended by finish manufacturer for type of use and finish indicated.

Chemical/Mechanical Finishes: Uncoated steel sheet complying with ASTM A1008 with luster or bright finish as required by finisher for applying electroplating or other metallic-finishing processes.

Sheet Metal Thickness: Not less than [**0.020 inch (26 ga)** ] [**0.024 inch (24 ga)** ].

Retain "Beam Grid Module" and "Beam Width by Height" paragraphs below if required.

* + - * 1. Beam Grid Module: [**8 inches square**] [**12 inches square**] [**18 inches square**] [**24 inches square**] [**30 inches square**] [**36 inches square**] [**48 inches square**] [**24 by 48 inches**] [**As indicated on Drawings**].
				2. Beam Width by Height: [**2 by 2 inches**] [**2 by 4 inches**] [**3 by 3 inches**] [**4 by 4 inches**] [**As indicated on Drawings**].

Retain "Cell Panel Module" and "Cell Module" paragraphs below if required.

* + - * 1. Cell Panel Module: [**24 inches square**] [**24 by 48 inches**] [**As indicated on Drawings**] [**Manufacturer's standard**].
				2. Cell Module: [**1 inch square**] [**2 inches square**] [**3 inches square**] [**4 inches square**] [**6 inches square**] [**8 inches square**] [**12 inches square**] [**24 inches square**] [**As indicated on Drawings**].
				3. Cell Profile, Width by Height: [**3/8 by 2 inches**] [**9/16 by 2 inches**] [**As indicated on Drawings**].
				4. Finish: [**Painted to match color indicated by product designation**] [**Painted to match Director’s Representative's sample**] [**Painted in color selected from manufacturer's full range**] [**Plated with metallic finish, as selected from manufacturer's full range**] [**Bright-reflective metallic finish selected from manufacturer's full range**].
			1. GENERAL FINISH REQUIREMENTS
				1. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
				2. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of the Work.
				2. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. PREPARATION
				1. Measure each installation area and establish layout of suspended decorative grids to balance border widths at opposite edges of each space. Comply with layout shown on reflected ceiling plans.
			3. INSTALLATION
				1. Install suspended decorative grids to comply with ASTM C636 and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
				2. Suspend ceiling hangers from building's structural members and as follows:

Install hangers plumb and free from contact with insulation or other objects within plenum that are not part of supporting structure or of grid suspension system.

Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

Where width of ducts and other construction within plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

Secure hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for structure to which hangers are attached and for hanger type involved.

Retain subparagraphs below that refer to applicable construction types. Revise first subparagraph below to suit Project.

Do not support grids directly from permanent metal forms or floor deck. Fasten hangers to expansion anchors or power-actuated anchors that extend through forms into concrete.

Do not attach hangers to steel deck tabs.

* + - * 1. Secure bracing wires to ceiling suspension members and to supports with a minimum of three tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with expansion anchors.
				2. Install edge moldings and trim of type indicated at perimeter of each suspended decorative grid and where necessary to conceal edges of grids.

Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, level with ceiling system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

Retain subparagraph below to prohibit exposed fasteners.

Do not use exposed fasteners, including pop rivets, on moldings and trim.

* + - * 1. Install suspended decorative grids in coordination with suspension system and exposed moldings and trim. Comply with installation tolerances according to CISCA's "Metal Ceilings Technical Guidelines."

Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.

Fit adjoining units to form flush, tight joints.

Where grid edges are visible, install cover profiles unless other trim is indicated.

* + - 1. FIELD QUALITY CONTROL

Retain this article if applicable. ASCE/SEI 7 requires special inspections for suspended ceiling systems in Seismic Design Categories D, E, and F; verify requirements of authorities having jurisdiction.

Retain first option in "Special Inspections" paragraph below if Director’s Representative engages special inspector. Consider retaining second option if authorities having jurisdiction allow Contractor to engage special inspector. If retaining second option, retain "Field quality-control reports" paragraph in "Informational Submittals" Article.

* + - * 1. Special Inspections: Director’s Representative will engage a qualified special inspector to perform the following special inspections:

Seismic design compliance.

Retain the remaining four paragraphs only when fastening to concrete decks.

Retain "Testing Agency" paragraph below, with or without "Special Inspections" paragraph above, to identify who shall perform tests and inspections. If retaining second option in "Testing Agency" paragraph, retain "Field quality-control reports" paragraph in "Informational Submittals" Article.

* + - * 1. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

Retain "Perform the following tests and inspections" paragraph below if Contractor engages testing agency to perform tests and inspections. Testing requirements are examples only and apply to ceilings with hangers attached to concrete by expansion and power-actuated anchors.

* + - * 1. Perform the following tests and inspections on each floor when installation of the suspended decorative grid on each floor is 20 percent complete. Do not proceed with installing the remainder of the grid on each floor until results in the test area for the floor show compliance with requirements.

Verify loadings in first two subparagraphs below with structural engineer based on ceiling loadings and seismic zone where Project is located. CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies - Seismic Zones 3 & 4" requires hanger-wire attachment devices to be "capable of supporting 100 lbf."

Hanger-Wire Attachment: Within each test area, testing agency selects one of every 10 power-actuated anchors and expansion anchors used to attach hangers to concrete and tests them for 200 lbf of tension.

Bracing-Wire Attachment: Within each test area, testing agency selects one of every two expansion anchors used to attach bracing wires to concrete and tests them for 440 lbf of tension.

When tested anchors do not comply with requirements, testing agency tests those anchors not previously tested until 20 pass consecutively and then resumes initial testing frequency.

* + - * 1. Suspended decorative grid anchors will be considered defective if they do not pass tests and inspections.
				2. Prepare tests and inspection reports.

Insert other field quality-control procedures required for Project.

* + - 1. CLEANING
				1. Clean exposed surfaces of suspended decorative grids, including trim and edge moldings, after removing strippable, temporary protective covering if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace grid components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and deformed grids.

END OF SECTION 095436