

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes acoustical panels and exposed suspension systems for acoustical panel ceilings.
- B. Related Sections include the following:
 - 1. Division 09 Sections "Non-Structural Metal Framing" and "Gypsum Board" for gypsum board ceilings.
- C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete-filled steel deck floors overhead ceilings.

1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Ceiling suspension system members.
 - 2. Method of attaching hangers to building structure.

- a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 4. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
1. Acoustical Panel: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.
 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- (300-mm-) long Samples of each type, finish, and color.
- D. Qualification Data: For testing agency.
- E. Field quality-control test reports.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- G. Research/Evaluation Reports: For each acoustical panel ceiling and components and anchor and fastener type.
- H. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.
- B. Source Limitations:
1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
 2. Suspension System: Obtain each type through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
1. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
 - a. Smoke-Developed Index: 450 or less.

- D. Formaldehyde VOC Classification: Provide acoustical panels that contain no formaldehyde or such low levels as to exceed stringent standards established by the Collaboration for High-Performance Schools (CHPS), the State of Washington, The American Society of Heating, Refrigeration and Air-Conditioning Systems, (ASHRAE), and the American-National Standards Institute, (ANSI).
- E. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
 - 1. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings-- Seismic Zones 0-2."
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.
 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

- A. Acoustical Panel ACT 1:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Eclipse Clima Plus #76777 by USG Interiors,.
 2. Classification: Provide Class A rated panels complying with ASTM E 1264 for type, form, and pattern as follows:
 - a. Type and Form: Type III, mineral base with painted finish; Form 1 nodular.
 - b. Pattern: E1 (lightly textured, embossed).
 - c. Color: White.
 - d. LR: Not less than 0.84.
 - e. NRC: Not less than 0.55.
 - f. CAC: Not less than 33.
 - g. Edge/Joint Detail: Tegular.

- h. Thickness: 3/4 inch (19 mm).
- i. Modular Size: 24 by 24 inches (610 by 610 mm) and as indicated on Drawings.

B. Acoustical Panel ACT 2:

- 1. Basis-of Design Product: Subject to compliance with requirements, provide Eclipse Clima Plus 78575 by USG Interiors, Inc. or a comparable product by one of the above-listed manufacturers.
- 2. Classification: Provide panels complying with ASTM E 1264 for Type, form and pattern as follows:
 - a. Type and Form: Type III, mineral base with painted finish; Form 1, nodular.
 - b. Pattern: E1 (lightly textured, embossed)
 - c. Color: White
 - d. LR: Not less than 0.85.
 - e. NRC: Not less than 0.55.
 - f. CAC: Not less than 35.
 - g. Edge/Joint Detail: Square
 - h. Thickness: 3/4 inch (19mm)
 - i. Modular Size: 24 by 48 inches (610 by 1220 mm).
 - j. Antimicrobial Treatment: Broad spectrum fungicide and bactericide or Fungicide based.

C. Acoustical Panel ACT 3:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Clean Room Clima Plus Class 10M – 100M. 56060 by USG Interiors, Inc. or a comparable product by one of the above-listed manufacturers.
- 2. Classification: Provide panels complying with ASTM E 1264 for Type, form and pattern as follows:
 - a. Type: Type X, high-density, ceramic- and mineral-base panels with scrubbable, vinyl-laminated finish, resistant to heat, moisture, and corrosive fumes.
 - b. Pattern: CGI (perforated, small holes, and embossed).
 - c. Color: White.
 - d. LR: Not less than 0.79.
 - e. NRC: Not less than 0.55.
 - f. CAC: Not less than 35.
 - g. Edge/Joint Detail: Square
 - h. Thickness: 5/8 inch (15 mm).
 - i. Modular Size: 24 by 24 inches (610 by 610 mm) and as indicated on Drawings.
 - j. Antimicrobial Treatment: Broad spectrum fungicide and bactericide or Fungicide based.

D. Acoustical Panel ACT 4:

1. Basis-of-Design Product: Subject to compliance with requirements, provide sheetrock Lay-in Clima Plus 3260 by USG Interiors, Inc. or a comparable product by one of the above-listed manufacturers.
2. Classification: Provide panels complying with ASTM E 1264 for Type, form and pattern as follows:
 - a. Type: Type XX, high-density, gypsum core panels with sealed edges and scrubbable, vinyl-laminated finish both sides, resistant to heat, moisture, and corrosive fumes.
 - b. Pattern: G (smooth-textured).
 - c. Color: White.
 - d. LR: Not less than 0.77.
 - e. CAC: Not less than 35.
 - f. Edge/Joint Detail: Square.
 - g. Thickness: ½ inch (12.7 mm).
 - h. Modular Size: 24 by 24 inches (610 by 610 mm) and as indicated on Drawings.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for at least four times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 1. Anchors For Use in Concrete-Filled Metal Decks: Anchors of type and material designed for casting into the underside of concrete decks after being fastened to the flutes of metal deck forms; with threaded sleeves for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to four times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Compression spring, expansion anchor, metal deck insert with multi-thread sleeve to accommodate hanging threaded rods; "Blue Banger Hanger Metal Deck Insert" by Simpson Strong-tie Anchor Systems.

- b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
 - 2. Direct attachment to non-concrete filled steel roof decks is strictly prohibited. Install an intermediate grid support system for the purpose instead, attached to the bottom flanges of structural steel framing members and complying with the following.
 - a. Channel support system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing by ASTM E 1190, conducted by a qualified design and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-), 0.135-inch- (3.5-mm-) diameter wire.
- E. Hanger Rods, Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation, with prefinished metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: Butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Steel or aluminum cold-rolled sheet.
 - 5. Cap Finish: Painted white.
- B. Basis-of-Design Products: Subject to compliance with requirements, provide the following products by USG Interior, Inc.:
 - 1. Type DX, 15/16-inch- (24-mm-) wide tees to support ACT-1 and ACT-2.
 - 2. Type CE, gasketed, 1-1/2-inch- (38-mm-) wide tees to support ACT-3.

3. Type AX, all aluminum, 15/16-inch- (24-mm-) wide tees to support ACT-4.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 1. Armstrong World Industries, Inc.
 2. BPB USA.
 3. Chicago Metallic Corporation.
 4. Fry Reglet Corporation.
 5. Gordon, Inc.
 6. USG Interiors, Inc. including Donn Brand.
- B. Basis-of-Design Products: Subject to compliance with requirements, provide the following by USG Interiors, Inc, or comparable products by one of the above-listed manufacturers.
 1. Type M7 wall angle for use with 15/16 inch tees.
 2. Type M12CE gasketed wall angle for use with 1-1/2 inch, gasketed tees.
 3. Type MS174 shadowline for use with tegular tile ceilings.
 4. Type M7A all aluminum wall angle for use with 15/16 inch, type AX tees.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.6 INTERMEDIATE GRID SUPPORT SYSTEM

- A. Slotted Channels, fittings and Accessories: Where required to install ceiling below and independent of steel roof decking, provide support framing where required to support ceiling below and independent of steel roof decks, consisting of steel channels clamped to flanges of steel beams.
 1. Slotted Channel Framing: 12 Gauge cold roll-formed carbon steel conforming to ASTM 570 GR 33 and A446 GRA.
 2. Fittings – angles, splice plates, beam clamps, side beam brackets: Punch pressed hot rolled steel plate, strip or coil conforming to ASTM A 575, A 576, A 635 and A 636.

3. Hardware – channel nuts, bolts, screws: Press formed, machined and hardened steel conforming to ASTM A 576, A 675, and A 108.
4. Finish: Electro-plated zinc (EG) conforming to ASTM B 633 SC1.

B. UL Listed Systems:

1. B-Line Systems Inc's B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
2. Caddy/Erico Product, Inc's A12 (1-5/8 x 1-5/8 inches), D12 (1-5/8 x 2-7/16 inches), E12 (1-5/8 x 3-1/4 inches).
3. Grinnells Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
4. Kindorf's B-900 (1-1/2 x 1-1/2 inches, B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 inches x 3 inches).
5. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 inches x 3-1/4 inches).
6. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-2 (1-5/8 x 2-1/2 inches).

2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 4. Where width of ducts and other construction within ceiling 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.
 5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 6. Secure flat, angle, channel, and rod hangers from structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 7. Do not support ceilings directly from permanent metal form floor or roof decks. Fasten hangers to cast-in-place hanger inserts, or metal roof deck inserts that extend through forms into concrete.
 8. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 9. Do not attach hangers to steel deck tabs.
 10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four 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 cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. Install panels with pattern running in one direction parallel to short axis of space.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections and prepare reports:
1. Suspended ceiling system.
 2. Hangers, anchors and fasteners.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- C. Tests and Inspections: Testing and inspecting of completed installations of acoustical panel ceiling hangers and anchors and fasteners shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 - a. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

- D. Remove and replace acoustical panel ceiling hangers and anchors and fasteners that do not pass tests and inspections and retest as specified above.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113