

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.02 SUMMARY

- A. Section includes:
 - 1. Acoustical panels and exposed suspension systems for ceilings.
 - 2. Linear wood ceiling panels and suspension system.
- B. Related Sections include the following:
 - 1. Division 01 Section "Sustainable Design Requirements."
 - 2. Division 07 Section "Joint Sealants" for acoustical sealants furnished and installed by this Section in acoustical panel ceiling assemblies.
 - 3. Division 09 Section "Gypsum Board Assemblies" for drywall suspension system and suspended gypsum board ceilings.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.04 DEFINITIONS

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

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. CTHPB Documentation Submittals: Comply with Division 01 Section "Sustainable Design Requirements" and provide the following in addition to other action submittals:
 - 1. Product Data for Credit 5d: For sealants, documentation including printed statement of VOC content.

2. Product Data for Credit d8: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
 3. Product Certificates for Credit d10: For products and materials required to comply with requirements for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
- C. Samples for Initial Selection: For components with factory-applied finishes.
- D. 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- square Samples of each type, color, pattern, and texture.
 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.

1.06 INFORMATIONAL SUBMITTALS

- A. 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.
 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.
 5. The Contractor is responsible for the preparation of a complete set of reflected ceiling Drawings showing lighting, air outlets, grid systems, access points and the like as indicated. No work will be allowed until approval of same has been received from the Architect. Coordinate all required information with respective subcontractors.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- C. Research/Evaluation Reports: For each acoustical panel ceiling and components.
- D. Maintenance Data: For finishes to include in maintenance manuals.
- E. Warranties: Special warranties specified in this Section.

1.07 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08 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 a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.09 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.

1.10 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, and partition assemblies.

1.11 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 percent of quantity installed, for each ceiling panel type.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2 percent of quantity installed, for each suspension system type.

1.12 WARRANTY

- A. Special Warranty for Acoustical Panel Ceilings and Suspension Systems: Manufacturer's standard form in which manufacturer agrees to replace acoustical panel ceilings and suspension systems that fail in materials or workmanship within specified warranty period.
 - 1. Failure of ceiling panels includes sagging and warping, and growth of mold, mildew and stain causing bacteria.
 - 2. Failure of suspension systems includes rusting.
 - 3. Warranty does not cover damages that may occur from vibrations, fire, water, freezing temperatures, accident or any form of abuse or exposure to abnormal conditions.
 - a. Warranty Period: 30 years from date of Substantial Completion.

4. Warranty Period for Wood Ceiling System: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and the Connecticut State Building Code.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 2. Smoke-Developed Index: 450 or less.

2.02 ACOUSTICAL PANELS, GENERAL

- A. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.
- B. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- C. 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 away from test surface per ASTM E 795.
- D. Antimicrobial Fungicide Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.03 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products as indicated by **Armstrong World Industries, Inc.** or a comparable product by one of the following:
 1. CertainTeed, Inc.
 2. USG Interiors, LLC (USG).

B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:

1. Ceiling Type APC-1:

- a. Basis of Design Product: **Armstrong World Industries, Inc.; Ultima #1914.**
- 1) Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with acoustically transparent membrane.
 - 2) Pattern: E (lightly textured).
 - 3) Color: White.
 - 4) LR: Not less than 0.88.
 - 5) NRC: Not less than 0.75.
 - 6) CAC: Not less than 35.
 - 7) Edge/Joint Detail: Beveled Tegular.
 - 8) Thickness: 3/4 inch.
 - 9) Modular Size: 24 by 48 inches.
 - 10) Antimicrobial Treatment: BioBlock + and HumiGuard Plus.
- b. Comparable Products:
- 1) CertainTeed, Inc.; Symphony M #1220BB-75-1.
 - 2) USG; Mars Acoustical Panels Item 88785.

2. Ceiling Type APC-2:

- a. Basis of Design Product: **Armstrong World Industries, Inc.; Ultima #1911.**
- 1) Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with acoustically transparent membrane.
 - 2) Pattern: E (lightly textured).
 - 3) Color: White.
 - 4) LR: Not less than 0.88.
 - 5) NRC: Not less than 0.75.
 - 6) CAC: Not less than 35.
 - 7) Edge/Joint Detail: Beveled Tegular.
 - 8) Thickness: 3/4 inch.
 - 9) Modular Size: 24 by 24 inches.
 - 10) Antimicrobial Treatment: BioBlock + and HumiGuard Plus.
- b. Comparable Products:
- 1) CertainTeed, Inc.; Symphony M #1220BB-75-1.
 - 2) USG; Mars Acoustical Panels Item 86785.

3. Ceiling Type APC-3:

- a. Basis of Design Product: **Armstrong World Industries, Inc.; Ultima Health Zone #1938.**
- 1) Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with acoustically transparent membrane.
 - 2) Pattern: E (lightly textured).
 - 3) Color: White.

- 4) LR: Not less than 0.86.
- 5) NRC: Not less than 0.70.
- 6) CAC: Not less than 38.
- 7) Edge/Joint Detail: Square.
- 8) Thickness: 3/4 inch.
- 9) Modular Size: 24 by 48 inches.
- 10) Antimicrobial Treatment: BioBlock + and HumiGuard Plus.

b. Comparable Products:

- 1) CertainTeed, Inc.; Symphony M RX #1220-75-1.
- 2) USG; Mars Healthcare Acoustical Panels Item 88189.

4. Ceiling Type APC-4:

a. Basis of Design Product: **Armstrong World Industries, Inc.; Ultima Health Zone #1937.**

- 1) Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with acoustically transparent membrane.
- 2) Pattern: E (lightly textured).
- 3) Color: White.
- 4) LR: Not less than 0.86.
- 5) NRC: Not less than 0.70.
- 6) CAC: Not less than 38.
- 7) Edge/Joint Detail: Square.
- 8) Thickness: 3/4 inch.
- 9) Modular Size: 24 by 24 inches.
- 10) Antimicrobial Treatment: BioBlock + and HumiGuard Plus.

b. Comparable Products:

- 1) CertainTeed, Inc.; Symphony M RX #1222-75-1.
- 2) USG; Mars Healthcare Acoustical Panels Item 86169.

5. Ceiling Type APC-5:

a. Basis of Design Product: **Armstrong World Industries, Inc.; Ultima #1982.**

- 1) Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with acoustically transparent membrane.
- 2) Pattern: E (lightly textured).
- 3) Color: White.
- 4) LR: Not less than 0.88.
- 5) NRC: Not less than 0.75.
- 6) CAC: Not less than 35.
- 7) Edge/Joint Detail: Beveled Tegular.
- 8) Thickness: 3/4 inch.
- 9) Modular Size: 24 by 72 inches.
- 10) Antimicrobial Treatment: BioBlock + and HumiGuard Plus.
- 11) Installation: 1/2 running bond.

b. Comparable Products:

- 1) CertainTeed, Inc.; Symphony M #1228BB-75-1.
- 2) USG; Mars Healthcare Acoustical Panels Item 86166.

6. Ceiling Type APC-6a, 6b:

a. Basis of Design Product: **Armstrong World Industries, Inc.; Calla #2823.**

- 1) Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with acoustically transparent membrane.
- 2) Pattern: E (lightly textured).
- 3) Colors:
 - a) Type APC-6a: custom to match Architect's sample.
 - b) Type APC-6b: custom to match Architect's sample.
- 4) LR: Not less than 0.85.
- 5) NRC: Not less than 0.85.
- 6) CAC: Not less than 35.
- 7) AC: Not less than 170.
- 8) Edge/Joint Detail: Square Tegular.
- 9) Thickness: 1 inch.
- 10) Modular Size: 24 by 48 inches.
- 11) Antimicrobial Treatment: BioBlock + and HumiGuard Plus.

b. Comparable Products:

- 1) CertainTeed, Inc.
- 2) USG.

- C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.04 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. 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.
- C. 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.
- D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

- E. 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- diameter wire.
- F. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- I. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.
- J. Hold-Down Clips: Provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.
 - 1. Provide hold down clips at all vestibules.

2.05 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Wide-Face, Capped, Double-Web, Hot-Dip Galvanized, G60, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, hot-dip galvanized according to ASTM A 653/A 653M, G60 coating designation, with prefinished, cold-rolled, 15/16-inch- wide, metal caps on flanges.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide **Armstrong World Industries, Inc.; Prelude XL 15/16" Exposed Tee System** or a comparable product by one of the following:
 - a. CertainTeed; 15/16" Classic Stab System.
 - b. USG Interiors, Inc.; Donn DX/DXL.
 - 2. Structural Classification: Intermediate duty system.
 - 3. Face Design: Flat, flush.
 - 4. Face Finish: White.
 - 5. Face Finish APC-6a, 6b: Custom color to match Architect's sample, two colors.

2.06 METAL EDGE MOLDINGS AND TRIM

- A. 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.
- B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide **Armstrong World Industries, Inc.; Axiom Classic Trim** or one of the following:
 - a. CertainTeed; Terminus.
 - b. USG Interiors, Inc.; Compasso Suspension Trim.
 2. Sizes:
 - a. ~~AT-1: As indicated on Drawings.~~
 - b. **AT-2: As indicated on Drawings.**
 3. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for Alloy and Temper 6063-T5.
 4. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
 5. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; organic coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - a. Colors: As selected by Architect from manufacturer's full range.

~~2.07~~ **LINEAR WOOD PANELS**

~~A. Linear Wood Wall and Ceiling Panels:~~

1. ~~Basis of Design Product (**LWP-1**): Subject to compliance with requirements, provide **Rulon International; Linear Panelized** or comparable product by one of the following:~~
 - a. ~~Armstrong World Industries, Inc.~~
 - b. ~~ASI Architectural; Linear Reveal.~~
- B. ~~Materials: Class A with flame spread index 0-25. Panel veneers shall be a minimum of 1/28" in thickness of "architectural grade" and shall be applied by a hot press process on both sides to balance the panel.~~
 1. ~~Veneer: White maple.~~
 2. ~~Length: As indicated.~~
 3. ~~Joint Side by Side: As selected by Architect from manufacturer's full range.~~
 4. ~~Factory Finish: Clear satin, with lacquer or class A FR Varnish topcoat.~~
 - a. ~~Color: Custom to match Architect's sample.~~

~~C. Core: Class A FR MDF Board.~~

~~D. Fabrication: Wood veneer panels manufactured to provide an open reveal between panels.~~

- ~~1. Panel Width: 3-1/2 inches (4 inches nominal).~~
- ~~2. Panel Thickness: 3/4 inches minimum.~~
- ~~3. Reveal Width: 1/2 inch.~~

~~E. Panel trim at edges, openings, or lighting fixtures shall be of solid wood in the same species as specified above.~~

~~F. Acoustical Blanket: Manufacturer's standard, black acoustical blanket.~~

- ~~1. Pound Density: 1.5 lb/cu.ft.~~
- ~~2. Thickness: 1-inch thick.~~
- ~~3. Noise reduction coefficient: 0.78.~~

~~G. Ceiling Panel Support Clips: Flat black noncorrosive .022 metal designed to install directly on to a standard 15/16" wide ceiling grid tee suspension system and shall not be installed more than 24" on center. Clips shall be manufactured for variable placement on the tee system and to automatically space the panels with a 1/2 inch reveal width between the panels. Clips shall be removable to provide access removal of the panels.~~

~~H. Provide direct attach clips for wall installation.~~

2.08 ACOUSTICAL SEALANT

A. Products: Comply with Division 07 Section "Joint Sealants."

PART 3 - EXECUTION

3.01 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.

3.02 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.

3.03 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. 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.
 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or 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.
 5. Secure flat, angle, channel, and rod hangers to 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.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. 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.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches 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 o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 - a. Install moldings in one piece at all walls 12 feet or less in length. Minimize quantity of pieces at longer walls.

- b. Use factory edges where joining lengths of molding. Abut moldings where joined; do not overlap.
- 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. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 - 2. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
 - 3. 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.
 - 4. Install hold-down clips in areas indicated.

3.04 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