

SECTION 09511

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Acoustical panels.
 - 2. Exposed suspension systems.
- B. Related Sections include the following:
 - 1. Division 6 Section "Finish Carpentry" for cementitious, acoustical wall panels.
 - 2. Division 9 Section "Gypsum Board Assemblies" for suspension systems provided for gypsum board ceilings.
 - 3. Division 15 and 16 Sections for coordination of air handling devices, fire protection devices, and electrical devices installed in ceiling systems.

1.03 DEFINITIONS

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

1.04 SUBMITTALS

- A. General: Submit in accordance with Section 01300.
- B. Product Data: For each type of product indicated.
- C. Samples: 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.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.

1.05 QUALITY ASSURANCE

- A. 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.
- B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Identify materials with appropriate markings of applicable testing and inspecting agency.
2. 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.

1.06 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. Store materials flat.
- 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.

1.07 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.
- B. Mechanical, electrical, and other utility service installations above the ceiling plane shall have been completed prior to the installation of the ceilings.

1.08 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.

1.09 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, but not less than a full carton of each type of tile.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 1. Products: Subject to compliance with requirements, provide one of the products specified.

2.02 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** away from test surface per ASTM E 795.
 2. Test Method for Ceiling Attenuation Class (CAC). Where acoustical panel ceilings are specified to have a CAC, provide units identical to those tested per ASTM E 1414 by a qualified testing agency.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
- C. Coating-Based Antimicrobial 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.

2.03 ACOUSTIC PANELS

- A. Acoustic Panel: ACT -1.
1. Size: 24 inches x 48 inches x 5/8-inch thick.
 2. Composition: Mineral wool fiber.
 3. Surface Finish: Vinyl paint; white.
 4. Surface Texture: Fissured.
 5. Edge: Square.
 6. NRC Range: .55.
 7. CAC Range: 35.
 8. Fire Hazard Classification: Class A, 0 - 25 flame spread.
 9. Dimensional Stability: Sag resistant at high humidity.
 10. Antimicrobial Treatment: Coating based.
 11. Product:
 - a. Armstrong World Industries, Inc.; Fine Fissured No. 1729.
 - b. USG Interiors, Inc.; Radar ClimaPlus No. 2410.
 12. Suspension System Type: Shall be as follows:
 - a. Type A: Provide in all locker room areas.
 - b. Type B: Provide in all non-locker room areas.
- B. Acoustic Panel: ACT -2.
1. Size: 24 inches x 24 inches x 5/8-inch thick.
 2. Composition: Mineral wool fiber.
 3. Surface Finish: Vinyl paint; white.
 4. Surface Texture: Fissured.
 5. Edge: Angled tegular.
 6. NRC Range: .55.
 7. CAC Range: 33.
 8. Fire hazard Classification: Class A, 0 - 25 flame spread.
 9. Dimensional Stability: Sag resistant at high humidity.
 10. Antimicrobial Treatment: Coating based.
 11. Product:
 - a. Armstrong World Industries, Inc.; Fine Fissured No. 1732.
 - b. USG Interiors, Inc.; Radar ClimaPlus No. 2220.
 12. Suspension System Type: B.
- C. Acoustic Panel: ACT -3.
1. Size: 24 inches x 48 inches x 1/2-inch thick.
 2. Composition: Mineral wool fiber.
 3. Surface Finish: Vinyl faced.
 4. Edge: Square.
 5. NRC Range: 0 - .10.
 6. CAC Range: 35 - 40.
 7. Fire Hazard Classification: Class A, 0 - 25 flame spread.
 8. Dimensional Stability: Sag resistant at high humidity.
 9. Product:

- a. Armstrong World Industries, Inc.; Clean Room VL Nonprforated, No. 870.
 - b. USG Interiors, Inc.; Clean Room ClimaPlus Class 100.
 - 10. Suspension System Type: A.
 - D. Acoustic Panel: ACT -4.
 - 1. Size: 24 inches x 48 inches x 5/8-inch thick.
 - 2. Composition: Mineral wool fiber.
 - 3. Surface Finish: Vinyl paint; white.
 - 4. Surface Texture: Medium.
 - 5. Edge: Square.
 - 6. NRC Range: 0.45 - 0.55.
 - 7. CAC Range: 35.
 - 8. Fire hazard Classification: Class A, 0 - 25 flame spread.
 - 9. Dimensional Stability: Sag resistant at high humidity.
 - 10. Antimicrobial Treatment: Coating based.
 - a. Armstrong World Industries, Inc.; Tundra No. 302.
 - b. USG Interiors, Inc.; Touchstone ClimaPlus No. 5894.
 - 11. Suspension System Type: A.
 - E. Replacement Acoustic Panels: Provide acoustical panels matching existing panels for replacement of acoustical panels damaged during removal and reinstallation of acoustical panels in designated areas.
 - F. Eggcrate Lens: Injection molded white acrylic eggcrate, pattern to match existing.
- 2.04 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 five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
 - 1. Power-Actuated Fasteners in Concrete: Fastener 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 per ASTM E 1190, conducted by a qualified testing 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 three 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.
 - E. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced **24 inches** o.c. on all cross tees.
 - 1. Locations:
 - a. In Vestibules.
 - b. Locker rooms.
 - c. Where indicated.

2.05 METAL SUSPENSION SYSTEMS FOR ACOUSTICAL PANEL CEILINGS

- A. Type A: Wide-Face, Aluminum 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, aluminum caps on flanges.
1. Structural Classification: Intermediate-duty system.
 2. Face Design: Flat, flush.
 3. Face Finish: Painted white.
 4. Locations: For use with ACT-1 in locker room areas and where indicated.
 5. Products:
 - a. Armstrong World Industries, Inc.; AL Prelude Plus XL, AL 7200 Series.
 - b. Chicago Metallic Corporation; Fire Front 1830 System.
 - c. USG Interiors, Inc.; ZXLA System.
- B. Type B: 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 coating designation, with prefinished 15/16-inch- wide metal caps on flanges.
1. Structural Classification: Intermediate-duty system.
 2. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
 3. Face Design: Flat, flush.
 4. Cap Material: Steel or aluminum cold-rolled sheet, as standard with manufacturer.
 5. Cap Finish: Painted white.
 6. Locations: For all suspended acoustical ceilings, except as otherwise noted.
 7. Products:
 - a. Armstrong World Industries, Inc.; Prelude Exposed Tee System, 7300 Series.
 - b. Chicago Metallic Corporation; 1200 System.
 - c. USG Interiors, Inc.; DX System.

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.
- B. 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, GENERAL

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic 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. Hangers shall be single lengths of wire without splices; coordinate lengths in deep ceiling cavities.
 2. 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.

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. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
 5. 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.
 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. Do not attach hangers to steel deck tabs.
 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 9. 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.
 10. Exposed pop rivets for grid alignment purposes shall not be permitted.
- C. Suspension system shall be reinforced to support diffusers, light fixtures and any additional members. Install hanger wires to grid at each corner of light fixtures. Coordinate location with electrical and other trades.
1. Each individual fixture and attachment with combined weight of 56 pounds or less shall have two 12-gage wire hangers attached at diagonal corners of the fixture. These wires shall be slack. Fixtures and attachments with a combined weight of greater than 56 pounds shall be independently supported from the structure at all four corners.
- 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.
 - a. Provide at all locations where gypsum wallboard does not go full height of studs.
 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.
 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 to run in the same direction.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 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 Vestibules, locker room areas, and at areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise 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