

SPECIAL SPECIFICATION

SECTION 09511S

ACOUSTICAL LAY-IN CEILINGS

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PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Section 01445S – Testing for Indoor Air Quality, Baseline IAQ, and Materials
- B. Section 01450S – Sequence of Finish Installation.
- C. Section 01505S – Construction Waste Management
- D. Section 01805S – Environmental Objectives
- E. 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. Section Includes:
 - 1. Exposed suspension system.
 - 2. Trim and accessories.
 - 3. Acoustical lay-in panels.
 - 4. Seismic grid restraint.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Concrete inserts.
 - 2. Metal deck hanger clips.
 - 3. Gypsum deck hanger clips.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)

1. A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
2. C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
3. C635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
4. C636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
5. E84 Standard Test Method for Surface Burning Characteristics of Building Materials
6. E119 Standard Test Methods for Fire Tests of Building Construction and Materials
7. E413 Standard Classification for Rating Sound Insulation
8. E580 Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint
9. E795 Standard Practices for Mounting Test Specimens during Sound Absorption Tests
10. E1264 Standard Classification for Acoustical Ceiling Products
11. E1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

1.04 DEFINITIONS

- A. NRC (Noise Reduction Coefficient): The weighted average sound absorption coefficient of the ceiling materials when tested in accordance with ASTM C423, with mounting No. E-400 (ASTM E795).
- B. CAC (Ceiling Attenuation Class): The acoustical ceiling rating derived in accordance with ASTM E1414 and classification ASTM E413..
- C. LR (Light Reflectance Coefficient): As determined by ASTM E1264.

1.05 SUBMITTALS

- A. General: Submit the following in accordance with conditions of Contract and Division 1, Section “Descriptive Submittals.”
- B. Product Data:
 - 1. Submit data for each distinct suspension system and acoustical unit type indicated.
 - 2. Submit acoustical ceiling panel manufacturer’s documentation of recycled content for acoustical ceiling panels.
 - 3. Submit acoustical ceiling panel manufacturer’s documentation of buyback and recycling program.
 - 4. Submit ceiling suspension system manufacturer’s documentation of U.S. manufactured steel.
- C. Asbestos-Free and Lead Paint-Free Certification: Submit manufacturer’s written certification that all materials are free of asbestos and lead paint.
- D. Manufacturer’s Certifications: Submit manufacturer’s representative certification that the proposed products are recommended and compatible with each other and substrates for the intended applications.
- E. Samples for Verification: Submit for each component indicated and for each exposed finish required, prepared on sample size indicated below:
 - 1. Acoustical units: 12 x 12-inch-square samples of each type, color, pattern, and texture.
 - 2. Exposed suspension and trim elements: 12-inch-long samples of each type, finish, and color.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed Acoustical Lay-In Ceiling applications similar in material, design and extent to that indicated for projects that have resulted in construction with a record of successful in-service performance.
- 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 E119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

- a. Fire-Resistance Rating: Indicated by design designations for UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
 - b. 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 E1264 for Class A materials as determined by testing identical products per ASTM E84:
- a. Maximum Flame Spread: 25.
 - b. Maximum Smoke Developed: 50.
- C. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.
- D. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580
 2. UBC Standard 25-2, "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings."

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store packaged materials in manufacturer's original unopened containers with seals unbroken and labels intact until time of use. Store materials off ground and under cover to prevent damage or contamination to materials by water, freezing, foreign matter or other causes. Promptly remove from site any materials, which show evidence of damage and immediately make all replacements necessary. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.08 PROJECT/SITE CONDITIONS

- A. Within each space to receive specified products, do not begin installation until the following conditions are met:
1. Work above ceilings has been finished, tested, and approved.
 2. Space to receive ceiling system is properly enclosed and protected from weather.

3. Any wet work within the space is dry.
- B. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained. Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.09 EXTRA MATERIALS

- A. For ceiling projects above 900 square feet, furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing the 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

2.01 MANUFACTURERS

- A. Manufacturers: Products made by the following manufacturers, provided they comply with requirements of Contract documents, will be among those considered acceptable, however, it is the Contractor's responsibility to provide only products compatible with adjacent materials in the assembly.
1. Armstrong World Industries, Inc. (www.armstrong.com)
 2. Celotex Corporation (www.celotex.com)
 3. Chicago Metallic Corporation (www.chicago-metallic.com)
 4. Tectum, Inc. (www.tectum.com)
 5. USG Interiors, Inc., USG Corp. (www.usg.com)
 6. Wave Worthington Armstrong Venture (formerly National Rolling Mills) (worthingtonindustries.com)

2.02 ACOUSTICAL CEILING UNITS

- A. General: Provide units conforming to applicable requirements of ASTM E1264 for Class A materials.

- B. Acoustical Panels: Water-felted, rigid mineral fiberboards:
1. Comply with the requirements of ASTM E1264, Type I, Type III, or Type XII; manufacturer's standard thickness, but not less than 5/8 inch thick.
 2. Recycled Content:
 - a. Type I, Type III: 50% minimum
 - b. Type XII: 25% minimum
 3. Size: 24 x 48 inches , unless indicated otherwise on Contract documents.
 4. Ceiling Attenuation Class: CAC-35.
 5. Noise Reduction Coefficient: Minimum NRC 0.55.
 6. Edge Profile: Square, unless indicated otherwise on Contract documents.
 7. Finish: Manufacturer's standard washable latex paint.
 8. Color: White, unless otherwise specified by architect.
 9. Face Texture/Pattern: Non-directional fissured (ASTM E1264 Pattern d), unless indicated otherwise on Contract documents.
 10. Light Reflectance Coefficient: Minimum LR 0.80 unless otherwise noted on drawings.

2.03 CEILING SUSPENSION SYSTEMS

- A. General: Provide direct hung systems conforming to specified requirements and to requirements of ASTM C635 unless indicated otherwise in Contract documents. If indirect hung system is indicated provide minimum 1-1/2 inch or larger carrying channels to maintain deflection limitation of 1/360 of span for loading indicated. Channels shall be not less than 0.1475 pounds per lineal foot galvanized steel. Provide U.S. manufactured steel components.
- B. Exposed Grid: Formed steel with painted finish.
1. Profile: Double-web tee, 15/16 inch wide.
 2. Structural Classification (ASTM C635): Heavy-Duty System unless otherwise specified
 3. Color and Texture: White color to match ceiling panels; standard smooth texture unless indicated otherwise on Contract documents.

- C. Finishes: Manufacturer's standard shop-applied finishes.
- D. Attachment Devices for Suspension System:
 - 1. Anchors: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C635, Table 1.
 - 2. Deck inserts and hanger clips: Fabricate from hot-dip galvanized steel.
 - 3. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A641, soft temper, with Class 1 coating, minimum 12 gage (0.106 inch diameter).
- E. Edge Moldings and Trim:
 - 1. Extruded Plastic or Metal: Provide molding for edges and ceiling penetrations indicated. Provide profiles suited to edge profiles of acoustical units and suspension members.
 - 2. Special-Purpose Moldings: Fabricate the following from extruded aluminum; profiles as indicated:
 - a. Reveal moldings.
 - b. Fascia moldings.
 - c. Circular column collar; include plastic in-fill and geared drawband.
 - 3. Circular Ceiling Penetrations: Provide edge moldings, which precisely fit penetrations.

PART 3 - EXECUTION

3.01 GENERAL

- A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.
- B. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.
- C. Coordinate ceiling system installation with work of other sections as required, including the following:
 - 1. Light fixtures.
 - 2. HVAC components.

3. Fire suppression system components.
4. Partitions.
5. Ceiling penetrations.
6. Seismic bracing and fixture hold-down clips.
7. The acoustical ceiling installer shall install all wires and anchors. The mechanical and electrical installers shall terminate all seismic wires to fixtures in ceiling suspension system. The mechanical and electrical installers shall furnish all hold-down clips as indicated by Division 15 Mechanical and Division 16 Electrical Sections for seismic installation.

3.02 EXAMINATION

- A. Examine substrates and conditions under which products of this section are to be installed and verify that the work may properly commence.
- B. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

3.03 PREPARATION

- A. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Conform to reflected ceiling plans to greatest extent possible.

3.04 SUSPENSION SYSTEM INSTALLATION

- A. General: Use direct hung suspension system unless indicated otherwise in Contract documents.
 1. Conform to the requirements of ASTM C636, manufacturer's installation instructions, and governing regulations.
 - a. Locate hangers not more than 6 inches from each end and spaced 4 feet maximum along each main runner, or for the indirect hung system, along each carrying channel, unless otherwise indicated.
 - b. Secure wire hangers by looping a minimum of three (3) turns and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures. Attachment devices shall be connected only to structural building members (beams, joists, precast "T").

2. Install hangers plumb and supported solely by building structure or carrying channels. Do not allow hangers to contact any objects or materials in ceiling plenum, which are not actual components of ceiling system.
 - a. Splay hangers only where necessary to avoid obstacles. Provide counter splaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
 - b. Install splay hangers or other means of seismic restraint as required to meet the requirements of ASTM E580 and UBC Standard 25-2.
 - c. Do not attach hangers to piping, conduit, or duct. Provide carrying channel trapeze support where obstruction cannot be avoided by splaying hanger 45 degrees from vertical or less.
 3. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
 4. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet , with cumulative tolerance not to exceed 1/4 inch . Bending or kinking of hangers is not allowed.
- B. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.

3.05 TRIM INSTALLATION

- A. Install edge moldings and trim units at acoustical ceiling borders, at locations indicated, and where required to cover acoustical unit edges.
- B. Molding and trim attachment: Space recommended manufacturers fasteners not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.

3.06 LAY-IN PANEL INSTALLATION

- A. Install acoustical panels for accurate fit with suspension system and trim members. Scribe and cut panels at ceiling perimeter and at obstructions to provide neat, precise fit.
- B. Square-Edge Panel Installation: Provide installation with panel edges, which are hidden from view by suspension members or trim.

3.07 ADJUST AND CLEAN

- A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.
- B. Replace ceiling system components, which are discolored or damaged in any way, in a manner, which results in the ceiling system showing no evidence of replacement work.

3.08 CEILING TILE REMOVAL

- A. Verify with the SNL Inspector (SDR or SCO) that asbestos and radiological surveys have been completed and the results allow free release.
- B. Remove ceiling tiles and separate clean (untreated, unpainted, and uncontaminated with water, adhesives, oils, solvents, mastics, and like products) ceiling tile for recycling.
- C. Stack clean ceiling tiles on pallets for handling.
- D. Store clean ceiling tiles off ground and under cover to prevent contamination of materials by water, freezing, foreign matter or other causes.
- E. Verify with SNL Inspector (SDR or SCO) that clean ceiling tile is not required by other SNL internal construction/ renovation projects.
- F. Contact Armstrong Ceiling Recycling Program (1-888-234-5464 ext. 1-8130 or www.ceilings.com) or similar program for pick-up and recycle. If volume of stored tiles does not meet the minimum required for manufacturer pick-up, coordinate with SNL Inspector to stockpile at designated SNL location until minimum volume is attained.

END OF SECTION