

**SECTION 09 51 00
ACOUSTICAL CEILINGS**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between //____// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. Coordinate with Section 09 06 00, SCHEDULE FOR FINISHES, to define texture, patterns, and colors other than white with locations in the room finish schedule and reflective ceiling plans.
4. Section does not include acoustical plaster, spray or trowel applications.
5. Do not use glass fiber units for lay-in ceiling applications.
6. Insure the reflective ceiling plans show panel sizes and layouts with unusual conditions.

PART 1- GENERAL

1.1 DESCRIPTION

- A. Metal ceiling suspension system for acoustical ceilings.
- B. Acoustical units.

1.2 RELATED WORK

- A. Color, pattern, and location of each type of acoustical unit:
 1. Section 09 06 00, SCHEDULE FOR FINISHES.
- //B. Access doors in adhesive applied tile: Section 08 31 13, ACCESS DOORS AND FRAMES.//

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling must withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: Comply with ASTM E1264 for Class A materials.
 2. Smoke-Developed Index: 25 or less.
- C. Acoustical Ceiling Tile - Recycled Content: Minimum // 5 // 10 // ____ // percent post-consumer recycled content, or minimum // 20 // 40 // ____ // percent pre-consumer recycled content at contractor's option.

SPEC WRITER NOTES:

1. Review USDA Biopreferred Categories for listed materials within the scope

of the following paragraph and include additional requirements, unless justification for non-use exists.

- D. Acoustical Ceiling Tile - Bio-based Content: Minimum // ___ // percent biobased materials.

SPEC WRITER NOTES:

1. Manufacturers offer different methods for anti-microbial treatments - coating-based treatment and panel-based treatment.
2. Coating-based consists of modifying the paint coating; panel-based incorporates treatment in the panel formula. The coating based method is more common.
3. Verify availability of treatment methods with manufacturer.
4. Some mineral base products do not require antimicrobials in order to pass standard industry tests like ASTM C1338 and UL181.

- E. Provide acoustical ceiling tile with anti-microbial treatment to inhibit growth of mold and mildew.

1. Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment; and showing no mold or mildew growth when tested in accordance with ASTM D3273.
2. Panel-Based Antimicrobial Treatment: Provide acoustical panels manufactured with antimicrobial treatment in the panels.

- F. Steel Suspension System - Recycled Content: Recycled Content: Minimum // 5 // 10 // ___ // percent post-consumer recycled content, or minimum // 20 // 40 // ___ // percent pre-consumer recycled content at contractor's option.

- G. VOC Emissions: Provide low VOC products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.4 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project // local/regional materials, // low-

emitting materials, // recycled content, // certified wood // _____// requirements.

- B. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For more information regarding the product categories covered by the BioPreferred® program, visit <http://www.biopreferred.gov>.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Provide documentation of conformance with performance requirements of this section.
- C. Samples:
1. Acoustical units, each type, with label indicating conformance to specification requirements, // including units specified to match existing. //
 2. Colored markers for units providing access.
- D. Manufacturer's Literature and Data:
1. Ceiling suspension system, each type, showing complete details of installation //, including suspension system specified to match existing and upward access system details for concealed grid systems.//
 2. Acoustical units, each type.
 - //3. Runners designed for snap-in attachment of metal pans.//
- E. Manufacturer's Certificates: Acoustical units, each type, in accordance with specification requirements.

1.6 DEFINITIONS

- A. Standard definitions as defined in ASTM C634.
- B. Terminology as defined in ASTM E1264.

SPEC WRITER NOTES:

1. Make material requirements agree with applicable requirements specified in the referenced Applicable Publications. Update and specify only that which applies to the project.

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic

designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

B. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):

ASCE/SEI-7-10	Minimum Design Loads for Buildings and Other Structures
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C. American Society for Testing and Materials (ASTM):

A641/A641M-09a	Zinc-coated (Galvanized) Carbon Steel Wire
C423-09a	Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
C634-11	Standard Terminology Relating to Environmental Acoustics
C635/C635M-13	Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
C636/C636M-13	Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
E84-13a	Surface Burning Characteristics of Building Materials
E413-10	Classification for Rating Sound Insulation.
E1264-08c1	Classification for Acoustical Ceiling Products
E1414/E1414M-11a	Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the site in the manufacturer's original unopened containers with brand name and type clearly marked
- B. Carefully handle and store materials in dry, watertight enclosures.
- C. Immediately before installation, store acoustical units for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed in order to assure proper temperature and moisture acclimation.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Maintain a uniform temperature of not less than 16 degrees C (60 degrees F) nor more than 29 degrees C 85 degrees F and a relative humidity of not more than 70 percent for 24 hours before, during, and 24 hours after installation of acoustical units.

1.10 SCHEDULING

- A. Complete and dry interior finish work such as plastering, concrete and terrazzo work before ceiling installation.
- B. Complete mechanical, electrical, and other work above the ceiling line; install and start operating heating, ventilating, and air conditioning systems in order to maintain temperature and humidity requirements.

PART 2- PRODUCTS

SPEC WRITER NOTES:

1. Make material requirements agree with applicable requirements specified in the referenced Applicable Publications.
2. Exposed grid for 600 mm X 1200 mm (2 by 4 feet) lay-in panels is preferred system for economy.
3. Do not use narrow exposed grid face suspension system for lay-in mineral base acoustical units. Minimum width is 22 mm (7/8) inch with 8 mm (5/16 inch) minimum bearing area for panel edge. No exceptions.

2.1 METAL SUSPENSION SYSTEM

- A. ASTM C635, heavy-duty system, except as otherwise specified.
- B. Exposed grid suspension system and wall molding:
 1. Exposed grid width not less than 22 mm (7/8 inch) with not less than 8 mm (5/16 inch) panel bearing surface.

2.2 WIRE

- A. Conform to ASTM A641, Class 1.
- B. Wire Hangers: Minimum diameter 2.68 mm (0.1055 inch).
- C. Bracing Wires: Minimum diameter 3.43 mm (0.1350 inch).

SPEC WRITER NOTES:

1. Review USDA Biopreferred Categories for listed materials within the scope of the following paragraph and include additional requirements, unless justification for non-use exists.

2.3 ACOUSTICAL UNITS

- A. General:

1. Provide panels complying with ASTM E1264; Class A Flame Spread per ASTM E84.
2. Minimum NRC (Noise Reduction Coefficient): 0.55 unless specified otherwise; ASTM C423.
3. Minimum CAC (Ceiling Attenuation Class): 38 unless specified otherwise: ASTM E1414.
4. Manufacturers standard finish, minimum Light Reflectance (LR) coefficient of 0.75 on the exposed surfaces, except as specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES. // Colored units integrally colored throughout.//

SPEC WRITER NOTES:

1. Acoustical tile or panel layouts and sizes on reflective ceiling plans are required with penetrations shown.
 2. In a small project without sufficient penetrations to require a reflective ceiling plan specify tile size for lay-in panels.
5. Lay-in Panels: Sizes as shown, with // square edges // reveal edges //.

2.4 ACCESS IDENTIFICATION

A. Markers:

1. Use colored markers with pressure sensitive adhesive on one side.
2. Make colored markers of paper or plastic, 6 to 9 mm (1/4 to 3/8 inch) in diameter.

B. Use markers of the same diameter throughout building.

C. Color Code: Use following color markers for service identification:

COLOR	SERVICE
Red	Sprinkler System: Valves and Controls
Green	Domestic Water: Valves and Controls
Yellow	Chilled Water and Heating Water
Orange	Ductwork: Fire Dampers
Blue	Ductwork: Dampers and Controls
Black	Gas: Laboratory, Medical, Air and Vacuum

PART 3 - EXECUTION

3.1 CEILING TREATMENT

- A. Lay out acoustical units symmetrically about center lines of each room or space unless shown otherwise on reflected ceiling plan; miter corners or install corner caps.
- B. Moldings:

1. Install metal wall molding at perimeter of room, column, or edge at vertical surfaces.
2. Install special shaped molding at changes in ceiling heights and at other breaks in ceiling construction to support acoustical units and to conceal their edges.

3.2 CEILING SUSPENSION SYSTEM INSTALLATION

A. General:

1. Comply with ASTM C635 and C636.
2. Install metal suspension system for acoustical tile and lay-in panels in accordance with ASTM C636, except as specified otherwise.
3. Use direct or indirect hung suspension system or combination thereof as defined in ASTM C635.
4. Support a maximum area of 1.48 m² (16 sf) of ceiling per hanger.
5. Prevent deflection in excess of 1/360 of span of cross runner and main runner.
6. Provide extra hangers, minimum of one hanger at each corner of each item of mechanical, electrical and miscellaneous equipment supported by ceiling suspension system not having separate support or hangers.
7. Provide not less than 100 mm (4 inch) clearance from the exposed face of the acoustical units to the underside of ducts, pipe, conduit, secondary suspension channels, concrete beams or joists; and steel beam or bar joist unless furred system is shown,
8. Use main runners not less than 1200 mm (48 inches) in length.
9. Install hanger wires vertically. Angled wires are not acceptable except for seismic restraint bracing wires.

3.3 ACOUSTICAL UNIT INSTALLATION

A. Comply with ASTM C636.

B. Markers:

1. Install markers of color code specified to identify the various concealed piping, mechanical, and plumbing systems.
2. Attach colored markers to exposed grid on opposite sides of the units providing access.
3. Attach marker on exposed ceiling surface of upward access acoustical unit.

3.4 CLEAN-UP AND COMPLETION

- A.** Replace damaged, discolored, dirty, cracked and broken acoustical units.
- B.** Leave finished work free from defects.

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