SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical units.
2. Metal ceiling suspension system for acoustical ceilings.
3. Adhesive application.

1.2 RELATED REQUIREMENTS

A. Color, pattern, and location of each type of acoustical unit: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. A641/A641M-09a(2014) - Zinc-coated (Galvanized) Carbon Steel Wire.
2. A653/A653M-15e1 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process.
3. C423-09a - Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
4. C635/C635M-13a - Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
5. C636/C636M-13 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
6. E413-16 - Classification for Rating Sound Insulation.
7. E580/E580M-14 - Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
8. E1264-14 - Classification for Acoustical Ceiling Products.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show size, configuration, and fabrication and installation details.

C. Manufacturer's Literature and Data:

1. Description of each product.
2. Ceiling suspension system indicating manufacturer recommendation for each application.

3. Installation instructions.
4. Warranty.

D. Samples:

1. Acoustical units, 150 mm (6 inches) in size, each type, including units specified to match existing.
2. Suspension system, trim and molding, 300 mm (12 inches) long.
3. Colored markers for access service.

1.5 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Ceiling System: Acoustical ceilings units on exposed grid suspension systems.

2.2 ACOUSTICAL UNITS

A. General:

1. Ceiling Panel and Tile: ASTM E1264, bio-based content according to USDA Bio-Preferred Product requirements.
   a. Mineral Fiber: 3.6 kg/sq. m (3/4 psf) weight, minimum.
2. Classification: Provide type and form as follows:
   a. Type ACT 1 Units - Mineral base with water-based painted finish maximum 10 g/l VOC; Form 2 - Water felted, minimum 16 mm (5/8 inch) thick.
   b. NRC (Noise Reduction Coefficient): ASTM C423, minimum 0.55.
   c. LR (Light Reflectance): Minimum 0.75 except as scheduled otherwise in Section 09 60 00, SCHEDULE FOR FINISHES.
3. Lay-in panels: Sizes as indicated on Drawings, with square edges.
   a. Sizes:
      1) Edge and Joint Detail: Square edges and joints as required to suit suspension and access system.

B. SPECIAL FACED ACOUSTICAL TILE UNITS: Anti-microbial coated surfaces suitable for use in Class 5 Clean Rooms per ISO 14644-1. Special faced acoustical tile units shall meet all general requirements stated in this specification.

1. Type ACT 2 Units - Perforated Ceramic Units for Wet Service.

a. Mineral wool material, fired in kiln to produce a stable panel, totally unaffected by moisture when submerged in water.
b. No damage when subjected to 10 cycles of steam at 135 degrees C (275 degrees F) and cooling to 10 degrees C (50 degrees F).
c. Minimum of 16 mm (5/8 inch) thick.
d. Not affected when immersed in five percent chlorine solution, except for paint finish.

2.3 METAL SUSPENSION SYSTEM

A. General: ASTM C635, intermediate-duty , except as otherwise specified.
1. Suspension System: Provide the following:
a. Galvanized cold-rolled steel, bonderized.
2. Main and Cross Runner: Use same construction Do not use lighter-duty sections for cross runners.

B. Exposed Grid Suspension System: Support of lay-in panels.
1. Grid Width: 22 mm (7/8 inch) minimum with8 mm (5/16 inch) minimum panel bearing surface.
2. Molding: Fabricate from the same material with same exposed width and finish.
3. Finish: Baked-on enamel flat texture finish.
a. Color: To match adjacent acoustical units unless specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.

C. Anchors and Inserts: Provide anchors or inserts to support twice the loads imposed by hangers.
1. Hanger Inserts: Steel, zinc-coated (galvanized after fabrication).

D. Wire: ASTM A641.
1. Size:
a. Wire Hangers: Minimum diameter 2.68 mm (0.1055 inch).
b. Bracing Wires: Minimum diameter 3.43 mm (0.1350 inch).

2.4 ACCESSORIES

A. Perimeter Seal: Vinyl, polyethylene or polyurethane open cell sponge material, density of 1.3 plus or minus 10 percent, compression set less than 10 percent with pressure sensitive adhesive coating on one side.
1. Thickness: As required to fill voids between back of wall molding and finish wall.
2. Size: Minimum 9 mm (3/8 inch) wide strip.

B. Access Identification Markers: Colored markers with pressure sensitive adhesive on one side, paper or plastic, 6 to 9 mm (1/4 to 3/8 inch) diameter.

1. Color Code: Provide the 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 ACOUSTICAL UNIT INSTALLATION

A. Layout acoustical unit symmetrically, with minimum number of joints.

B. Installation:

1. Install acoustic tiles after wet finishes have been installed and solvents have cured.
2. Install lay-in acoustic panels in exposed grid with minimum 6 mm (1/4 inch) bearing at edges on supports.
   a. Install tile to lay level and in full contact with exposed grid.
   b. Replace cracked, broken, stained, dirty, or tile.
3. Markers:
   a. Install color coded markers to identify the various concealed piping, mechanical, and plumbing systems.
   b. Attach colored markers to exposed grid on opposite sides of the units providing access.
   c. Attach marker on exposed ceiling surface of upward access acoustical unit.

C. Touch up damaged factory finishes.

1. Repair painted surfaces with touch up primer.

3.2 CEILING SUSPENSION SYSTEM INSTALLATION

A. General: Install according to ASTM C636.

1. Use direct or indirect hung suspension system or combination of both.

2. Support a maximum area of 1.48 sq. m (16 sq. ft.) of ceiling per hanger.
3. Prevent deflection in excess of 1/360 of span of cross runner and main runner.
4. Provide additional hangers located at each corner of support components.

B. Direct Hung Suspension System: ASTM C635.
1. Support main runners by hanger wires attached directly to the structure overhead.
2. Maximum spacing of hangers, 1200 mm (4 feet) on centers unless interference occurs by mechanical systems. Use indirect hung suspension system where not possible to maintain hanger spacing.

C. Anchorage to Structure:
1. Steel:
a. Install carrying channels for attachment of hanger wires.
1) Size and space carrying channels to support load within performance limit.
2) Attach hangers to steel carrying channels, spaced four feet on center, unless area supported or deflection exceeds the amount specified.
b. Attach carrying channels to the bottom flange of steel beams spaced not 1200 mm (4 feet) on center before fireproofing is installed. Weld or use steel clips for beam attachment.
c. Attach hangers to bottom chord of bar joists or to carrying channels installed between the bar joists when hanger spacing prevents anchorage to joist. Rest carrying channels on top of the bottom chord of the bar joists, and securely wire tie or clip to joist.

3.3 CEILING TREATMENT

A. 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.

B. Perimeter Seal:
1. Install perimeter seal between vertical leg of wall molding and finish wall, partition, and other vertical surfaces.

2. Install perimeter seal to finish flush with exposed faces of horizontal legs of wall molding.

3.4 CLEANING

A. Remove excess adhesive before adhesive sets.

B. Clean exposed surfaces. Remove contaminants and stains.

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