SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing, delivering, erecting and installing the following work:
   1. Suspended metal grid ceiling system.
   2. Acoustical units.
   3. Supplementary insulation above ceiling.
   4. Trim, perimeter pockets, and other accessories required for a complete installation.

1.02 REFERENCE STANDARDS

A. Editions of listed standards as referenced by applicable codes, or most current edition if not referenced:

   1. ASCE. American Society of Civil Engineers; www.asce.org.
      a. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
   2. ASTM. ASTM International; www.astm.org.
      a. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
      b. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
      c. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
      d. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
      e. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
      f. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.
      g. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. UL. Underwriters Laboratories; www.ul.com.
      a. UL (FRD) - Fire Resistance Directory.
   4. USDA. U.S. Department of Agriculture; www.usda.gov.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Scheduling per Section 01 32 16 - Construction Progress Schedule, and as follows:
   1. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
   2. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Construction Submittals
   1. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, mechanical and electrical items installed in the ceiling, and seismic braces, compression resistant hangers, and other ceiling mounted equipment or devices. Indicate cut tile locations and working points within each space.

2. Product Data: Submit manufacturer's printed product literature including products standards, acoustical tile materials, suspension system components, finishes, installation instructions, use limitations, and recommendations.
3. Samples: Submit two samples 6 by 6 inch in size illustrating material and finish of acoustical units.
4. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.
5. Engineering Data: Provide engineering data and shop drawings for intermediate support framing system for cafeteria “cloud” ceilings. Document loads on roof framing, fastening points, and types of anchorage and connectors. Design shall be signed and sealed by the professional structural engineer licensed in the state of Vermont.

C. Closeout Submittals
1. Submit in accordance with Section 01 70 00 - Execution and Closeout Requirements and Section 01 78 00 - Closeout Submittals.
2. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
a. See Section 01 60 00 - Product Requirements, for additional provisions.
b. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company with a minimum of three years experience specializing in work of the type required by this Section.
B. Single Source Responsibility: Furnish system materials from one manufacturer for entire Project, unless otherwise acceptable to Architect.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements and submittal instructions and the following:
1. Materials and Workmanship Warranties: Provide 10 year panel / 15 year system, and 10 year / lifetime system warranty (depending on tile specified) warranties, issued by the manufacturer upon completion of the work and beginning on the date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels: Subject to compliance with requirements of these Specifications, provide equivalent product from one of the following manufacturers, except where otherwise noted for specific ceiling types below:
1. Armstrong World Industries, Inc: www.armstrongceilings.com.
2. CertainTeed Corporation: www.certainteed.com.
3. USG Corporation: www.usg.com/ceilings.
4. Other manufacturer’s products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and or appearance. Submit as substitutions: see Section 01 25 00 - Substitution Procedures

2.02 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with the following:
1. Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.

2.03 ACOUSTICAL UNITS AND SUSPENDED METAL GRID CEILING SYSTEMS

A. Regulatory Requirements:
1. Acoustical materials and suspension systems shall be installed in accordance with the manufacturer's recommendations and in compliance with seismic category as indicated on

Structural Drawings.

2. Acoustical materials and suspension systems shall be installed in accordance with the IBC, MSBC (780 CMR).
3. Acoustical materials and suspension systems shall be installed in accordance with ASCE 7.
4. Rate acoustical ceiling systems, indicated as fire resistant, for fire endurance as specified when tested in accordance with ASTM E119.
5. Provide acoustical units with a flame spread of 25 or less and smoke development of 50 or less when tested in accordance with ASTM E84, Class 1.

B. Acoustical Units - General: ASTM E1264, Class A.

C. Performance / Design Criteria:

1. Design Components to ensure light fixtures will not induce eccentric loads. Where components may induce rotation of ceiling system components, providing stabilizing reinforcement.
2. Installed Ceiling System:
   a. Exhibit maximum deflection of 1/360 of span.

2.04 MATERIALS - ACOUSTICAL UNITS

A. Acoustical Tile Type ACP1: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:

1. Size: 24 by 48 inches .
2. Thickness: 1 inches.
3. Composition: Water felted.
4. Light Reflectance: .85 percent, determined in accordance with ASTM E1264.
5. NRC: .85, determined in accordance with ASTM E1264.
6. Ceiling Attenuation Class (CAC): .35, determined in accordance with ASTM E1264.
7. Edge: Square lay-in.
8. Surface Color: White.
9. Surface Pattern: Fine textured.
10. Basis-of Design Product: Calla by Armstrong.

B. Acoustical Tile Type ACP1A: Painted mineral fiber, ASTM E1264 Type III, with to the following characteristics:

1. Same as ACP1, except size is 24 by 24 inches.

C. Acoustical Panels Type ACP2: Painted mineral fiber, ASTM E1264 Type IV, with the following characteristics:

1. Size: 24 by 48 inches.
2. Thickness: 3/4 inches.
3. Composition: Wet felted.
4. Light Reflectance: .90 percent, determined in accordance with ASTM E1264.
5. NRC: .90, determined in accordance with ASTM E1264.
6. ~~NRC: .85, determined as specified in ASTM E1264.~~ 2.2
7. Ceiling Attenuation Class (CAC): 0.35, determined in accordance with ASTM E1264.
8. Edge: Square lay-in.
9. Surface Color: White.
10. Surface Pattern: Fine textured. 2.2
11. Basis-of Design Product: Ultima by Armstrong.

AD2.2.01.04 Project Manual, section 09 51 00 ACOUSTICAL CEILINGS, After Acoustical Panels Type ACP2 section 2.04-C add
D. Acoustical Panels Type ACP2A: Painted mineral fiber, ASTM E1264 Type IV, with the following characteristics:
1. Same as ACP2, except size is 24 by 24 inches
Renumber subsequent subparagraphs accordingly.

D. Acoustical Panels Type ACP5: painted mineral fiber ASTM E1264 Type XX with the following characteristics:

1. Size: 24 by 48 inches.

2. Thickness: 5/8-inch
3. Composition: Water-felted, ceramic bonded
4. Light Reflectance: .82 percent, determined as specified in ASTM E1264.
5. NRC: .55, determined as specified in ASTM E1264
6. Ceiling Attenuation Class (CAC): 40, determined as specified in ASTM E1264.
7. Panel Edge: Square lay-in.
8. Surface Pattern: Smooth.
9. Surface Color: White.
10. Basis-of Design Product: Ceramaguard Fine Fissured by Armstrong.

2.05 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Same as for acoustical units.
   2. Other manufacturer's products accepted by the Awarding Authority as equal to the specified products in terms of construction, quality, durability, performance, and or appearance. Submit as substitutions: see Section 01 25 00 - Substitution Procedures.

B. Suspension Systems - General: ASTM C635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as necessitated by the work.

C. Exposed Suspension System: Formed steel, commercial quality cold rolled.
   1. Structural Classification: Heavy-duty, when tested in accordance with ASTM C635/C635M.
   2. Profile: Tee; 15/16 inch face width.
   3. Finish: Baked enamel.
   4. Color: White.
   5. Basis of Design Product: Prelude tee suspension system, by Armstrong

D. Exposed Suspension System: Extruded aluminum.
   1. Application(s): Wet areas.
   2. Structural Classification: Light-duty, when tested in accordance with ASTM C635/C635M.
   3. Profile: Tee; 15/16 inch face width.
   4. Construction: Double web.
   5. Finish: Baked enamel.
   6. Color: White.
   7. Basis of Design: Prelude, by Armstrong.

2.06 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

C. Perimeter Moldings: Same metal and finish as grid.
   1. At Exposed Grid: Angle molding: L-shaped, for mounting at same elevation as face of grid.
   2. At Acoustic Ceiling Clouds and where indicated on drawings: Prefinished aluminum Compasso edge trim by USG, or an Architect-acceptable equivalent.
   3. At celing height transitions in sizes and location indicated on Drawings: Compasso by USG, or an Architect-acceptable equivalent.

D. Gypsum Board: Fire rated type; 5/8 inch thick, ends and edges square, paper faced.

E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examination and Acceptance of Conditions per Section 01 40 00 - Quality Requirements, and as follows:
   1. Carefully examine installation areas with Installer present, for compliance with requirements affecting work performance.
      a. Verify that field measurements, substrates, structural support, utility connections, tolerances, levelness, plumbness, humidity, moisture content level, cleanliness and other conditions are ready to receive work.
      b. Verify that layout of hangers will not interfere with other work.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. General: Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, ASCE 7, Drawings and as follows:
   1. Install acoustical materials and suspension systems in accordance with UL (FRD) Design Number for roof/ceiling assembly indicated on Drawings.
   2. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
      a. Provide seismic bracing with diagonal wire hangers at each room exceeding 750 SF and as made necessary by building codes.
      b. Locate system on room axis according to reflected plan.
      c. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
         1) Use longest practical lengths.
         2) Overlap and rivet corners.
   3. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
   4. Provide hanger clips during steel deck erection. Provide additional hangers and inserts.
   5. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
   6. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
   7. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
   8. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
   9. Do not eccentrically load system or induce rotation of runners.
   10. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.
   11. Design and install intermediate steel support system to span between roof framing and provide suspension points coordinated with acoustical ceiling cloud configurations.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. General: Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, ASCE 7, Drawings and as follows:
   1. Install acoustical materials and suspension systems in accordance with UL (FRD) Design Number for roof/ceiling assembly indicated on Drawings.

2. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
3. Fit border trim neatly against abutting surfaces.
4. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
5. Cutting Acoustical Units:
    a. Cut to fit irregular grid and perimeter edge trim.
    b. Make field cut edges of same profile as factory edges.
    c. Double cut and field paint exposed reveal edges.
6. Install hold-down clips on panels within 20 ft of an exterior door.
7. Locate ceiling access panels directly under the items that require access, and as indicated.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Remove, repair and reinstall or restore in place damaged items prior to inspection for Substantial Completion.
    1. Replace damaged materials and components with new if repair not acceptable to Architect.

3.05 CLEANING

A. Comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.

B. Following installation, clean dirty discolored surfaces of acoustical units and leave them free of defects.

3.06 PROTECTION

A. Protect installed work from subsequent construction operations until date of Substantial Completion or Owner occupancy, whichever occurs first.

END OF SECTION