

**SECTION 09 51 00
ACOUSTICAL CEILINGS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Carefully review and examine all other Contract Documents for requirements therein affecting the work of this Section. Furthermore, coordinate and sequence the work of this Section with all other trades affected.

1.2 SECTION INCLUDES

- A. Furnish and install suspended acoustical tile ceiling including suspension system and associated edge moldings.
- B. Furnish and install suspended linear metal ceilings including suspension system and associated trim.

1.3 RELATED SECTIONS

- A. Section 09 22 00 - METAL SUPPORT ASSEMBLIES: Suspension system for suspended drywall construction ceilings and soffits.
- B. Section 09 29 00 – GYPSUM BOARD: Soffit and wall construction adjacent to acoustical ceilings.
- C. Division 21 – FIRE SUPPRESSION: for sprinkler heads in ceiling system.
- D. Division 23 – HVAC: for Air diffusion devices in ceiling.
- E. Division 26 - ELECTRICAL: Light fixtures and independent hangers for suspended fixtures.

1.4 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 20 – REFERENCE STANDARDS AND DEFINITIONS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM C 635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 1. ASTM C 636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 - 2. ASTM E 580 - Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
 - 3. ASTM E 1264 - Classification of Acoustical Ceiling Products.
 - 4. UL Fire Resistance Directory and Building Material Directory.
 - 5. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.
- B. The following reference materials are hereby made a part of this Section by reference thereto:
 - 1. CISCA (Ceilings and Interior Systems Contractors Association) - Acoustical Ceilings: Use and Practice.

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- C. 2022 Connecticut State Building Code.
- D. Connecticut High Performance (Green) Building Standards for State Agency Buildings and School Buildings – 2019 Update – Connecticut High Performance Buildings.

1.5 SUBMITTALS

- A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:
 - 1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
 - 2. Shop drawings:
 - a. 1/4 inch scale plans of each room or space; indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to the system.
 - b. Large scale installation details of special conditions.
 - c. All drawings bearing dimensions of actual measurements taken at the project.
 - 3. Samples:
 - a. 6 by 6 inch samples of acoustical units, illustrating material and finish.
 - b. 12-inch long samples of suspension system components including main runners cross runner and edge trim.
- B. High Performance Buildings Compliance Submittal: Submit the required documents in accordance with the Checklist as a separate submittal package to Construction Manager's High Performance Buildings Compliance Coordinator, including information on each product specified:
 - 1. Local/Regional Materials:
 - a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery of raw materials used in the products manufacturing; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing location(s): Indicate location of manufacturing facility; include distance between manufacturing facility and the project site.
 - 2. Recycled content: Manufacturer's certification of recycled content indicating percentage by weight of both pre-consumer and post-consumer recycled content.
 - 3. VOC Content: Submit documentation showing VOC content for all materials submitted.
 - 4. Construction Waste Management.

1.6 QUALIFICATIONS

- A. Applicator specializing in applying the work of this Section with a minimum of 3 years experience.

1.7 PROJECT CONDITIONS

- A. Maintain uniform temperature of minimum of 60 degrees Fahrenheit and humidity of 20 to 40 percent prior to, during, and after installation.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, to allow work, which will be concealed by the ceilings to be completed prior to commencing installing the ceilings in such locations.

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- B. 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.
- C. Install acoustical units after interior wet work is dry.
- D. Coordinate work with elevator installer, to ensure acoustical ceiling is not installed until temporary service use of elevator by Contractor is no longer necessary and the elevator is ready for final inspection.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical ceiling panel in original, unopened packages and store protected in a fully enclosed space.

1.10 WARRANTY

- A. In addition to the specific guarantees requirements of the Section 01 78 30 – “Warranties and Bonds”, the Contractor shall obtain in the Owner’s name the standard written manufacture’s guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer’s published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities, which the Contractor may have by law or other provisions of the Contract Documents.

1.11 EXTRA MATERIALS

- A. Provide to the Owner, extra ceiling panel and suspension components, 5 percent of each type installed.

1.12 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
 - 1. This Sub-Contractor shall furnish tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the work of this section. All such items shall meet the approval of the Owner but responsibility for design, strength and safety shall remain with the Contractor. All such items shall comply with Federal OSHA regulations and applicable codes, statutes, rules and regulations, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by the Associated General Contractors (AGC) and the standards of the State Labor Department.
- B. Staging, exterior and interior, required for the execution of the work of this section, shall be furnished, erected, relocated if necessary and removed by this Sub-Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or equal:
 - 1. Acoustical ceiling panel:
 - a. USG Interiors Inc., Chicago IL.
 - b. Armstrong World Industries, Inc., Lancaster PA.

- c. CertainTeed Corp., Valley Forge, PA.
 - d. OWA USA, Munster, IN
2. Suspension system:
- a. USG Interiors Inc., Chicago IL.
 - b. Armstrong World Industries, Inc., Lancaster PA
 - c. CertainTeed Corp., Valley Forge, PA
 - d. OWA USA, Munster, IN

2.2 ACOUSTICAL CEILING PANELS

- A. ACT-1 Ceiling panel (classrooms):
- 1. Panel size: 7/8-inch thick, 24 by 24 inch panels.
 - 2. Panel edge: USG – “SLT” or Armstrong “Bevelled Tegular”
 - 3. Description: ASTM E-1264 Type IV, Form 1 and 2, Pattern E,G; class A flame spread, mineral fiber, fine-textured panel.
 - 4. Color: White.
 - 5. Minimum light reflectance: LR 0.90.
 - 6. Acoustical characteristics:
 - a. Minimum NRC: 0.85
 - b. Minimum CAC: 35
 - 7. Acceptable products:
 - a. USG: “Mars High-NRC/High-CAC,” Number 88135.
 - b. Armstrong: “Ultima High NRC,” Number ~~1914~~ 1941. **ADDENDUM NO. 4**
 - c. CertainTeed: “Symphony m High NRC,” Number 1222BB-85-1.
- B. ACT-2 Ceiling panel (corridors):
- 1. Panel size: 3/4-inch thick, 24 by 24 inch panels.
 - 2. Panel edge: USG – “SLT” or Armstrong “Bevelled Tegular”
 - 3. Description: ASTM E-1264 Type IV, Form 1 and 2, Pattern E,G; class A flame spread, mineral fiber, fine-textured panel.
 - 4. Color: White.
 - 5. Minimum light reflectance: LR 0.89.
 - 6. Acoustical characteristics:
 - a. Minimum NRC: 0.75
 - b. Minimum CAC: 35
 - 7. Acceptable products:
 - a. USG: “Mars,” Number 86785
 - b. Armstrong: “Ultima,” Number 1911.
 - c. CertainTeed: “Symphony m,” Number 1222BB-75-1-1
- C. ACT-3 Ceiling panel (cafeteria, media center, and admin offices):
- 1. Panel size: 1-inch thick, 24 by 24 inch panels.
 - 2. Panel edge: Armstrong beveled tegular.
 - 3. Description: ASTM E-1264 Type W, Form 2, Pattern E; class A flame spread, cast mineral fiber board.
 - 4. Minimum light reflectance: 0.87
 - 5. Acoustical characteristics:

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- a. Minimum NRC: 0.80
 - b. Minimum CAC: 35
 - 6. Acceptable products:
 - a. USG product "Mars High NRC", Number 87200.
 - b. Armstrong product: Ultima High NEC, Item# 1941.
 - c. CertainTeed: Equal product as approved by architect.
 - d. OWA USA product: Octave80 High CAC, Number 77515.
- D. ACT-4 Ceiling panel (kitchen):
- 1. Panel size: 5/8-inch thick, 24 by 48 inch panels.
 - 2. Panel edge: Square edge.
 - 3. Description: ASTM E-1264 Type IX, Form 2, Pattern G; class A flame spread, non-combustible.
 - 4. Minimum light reflectance: LR 0.90.
 - 5. Acoustical characteristics:
 - a. Minimum CAC: 35
 - 6. Acceptable products:
 - a. USG product: "Kitchen Lay-in Panel", Number 3410
 - b. Armstrong product: "Kitchen Zone", Number 672.
 - c. CertainTeed product: Equal product as approved by architect
 - d. OWA USA product: Sanitas 02 Plain Number 75693.
- E. ACT-5 Ceiling panel (bathrooms):
- 1. Panel size: 5/8-inch thick, 24 by 24 inch panels.
 - 2. Panel edge: USG "SLT" or Armstrong "Angled Tegular".
 - 3. Description: ASTM E-1264 Type III, Form 2, Pattern CE; class A flame spread, cast mineral fiber board.
 - 4. Color: White.
 - 5. Minimum light reflectance: LR 0.86.
 - 6. Acoustical characteristics:
 - a. Minimum NRC: 0.50
 - b. Minimum CAC: 35
 - 7. Acceptable products:
 - a. USG product: "Olympia Micro" Number 4221.
 - b. Armstrong product: "Dune," Number 1774.
 - c. CertainTeed: Equal product as approved by architect
 - d. OWA USA product: Sandila/N, Number 82723.
- F. ACT-6 Ceiling panel (music rooms):
- 1. Panel size: 24 by 24 inch panels with varying thickness.
 - 2. Description: Panels shall be perforated aluminum finish and come with Acoustiband backer..
 - 3. Color: White.
 - 4. Acoustical characteristics:
 - a. Minimum NRC: 0.60
 - 5. Acceptable products:

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- a. USG product: "Geometrix 3 Dimensional Metal Panels".
- b. Or approved equal by the Architect.

2.3 LINEAR METAL CEILINGS

A. Linear Metal Ceiling Type LMC-1

1. Basis of Design: Paraline Plus Linear Metal Ceilings, with Perforated Pattern A062D, Acoustibond Backer and Snap Loc Insert.
2. Material: Electrogalvanized steel.
3. ~~Finish: Post-production, powder-coat-painted.~~ **ADDENDUM NO. 2**
4. Thickness: 0.021 inch.
5. Size: Standard 7-inch-wide nominal panels including 1" reveal, 1 inch high x 12 feet long.
6. Edge Details: Tapered.
7. Color: As selected by the Architect *from the manufacturer's full range of wood grain metal options.* **ADDENDUM NO. 2**
8. Perforation: USG Pattern No. A062D.
9. Acoustical Backer: Acoustibond Backer, Poly Bag Infill.
10. Filler between panels: USG's Snap-Loc Recessed Insert in color Black.
11. Suspension System: Provide complete suspension systems with main runners, cross runners, hangers, trim molding, seismic retention clips, load resisting struts and other suspension components required to support ceiling.
12. Metal Suspension Perimeter Trim: USG's Compasso in finish to match Linear Metal Planks. Trim height to be 4 inches.
13. Fire Tests: Complete system test including suspension, primed aluminum shall meet ASTM E 84 Class A.
14. Acceptable Product: Paraline Plus as manufactured by USG Interiors; or approved equal by Rockfon (Planar and Planar Plus), or Gordon-Inc. (Marquis).
15. Accessories:
 - a. Panel Splices; for connecting 7-inch Paraline Plus panels.
 - b. Panel End Caps; for exposed installations to close up open end of 7-inch panel.
 - c. Trim Molding; angle molding at pan ends perpendicular to wall.

B. Linear Metal Ceiling Type LMC-2

1. Basis of Design: Ceiling Plus Planx / Mirra Perforated ceiling panels.
2. Panels are to be manufactured from single sheets of aluminum selected for surface flatness, smoothness and freedom from surface blemishes where exposed to view in a finished unit. Do not use material where the exposed surface exhibit pitting, seam marks, roller marks, stains, discolorations, or variations in flatness exceeding those permitted by referenced standards for stretcher-leveled aluminum alloy sheets. Panel sizes shall be standard length of 96 inches with a profile of 4 inches and a standard 5/8 inch reveal between each panel.
3. Panels to die formed with a 1-1/4" vertical with .3" minimum integral returns on panel sides. No fasteners of any kind shall be visible on exposed face surfaces of ceiling panels or support tees. Down light openings and other ceiling penetrations shall be factory precision cut whenever viable. Roll forming is not acceptable.
4. Panel material shall be primed aluminum sheet type 3105 series alloy that has up to 90% recycled content. It shall be machine stretcher-leveled and a minimum of 0.032" thickness, or greater if required, so that the panel deflection does not exceed L/360.

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5. Panel finish shall be "Sarante" PVC free, laminate that is permanently bonded to the aluminum sheet with formaldehyde free, water based adhesive of minimum bond strength of 425 psi @ 25 degrees C.
6. Color: As selected by the Architect *from the manufacturer's full range of wood grain metal options.* **ADDENDUM NO. 2**
7. Perforation: USG Pattern No. A062D.
8. Suspension System: Provide complete suspension systems with main runners, cross runners, hangers, trim molding, seismic retention clips, load resisting struts and other suspension components required to support ceiling.
9. End Profile: Panel end joints are butt condition with integral splice. Integral panel end return shall be provided.
10. Trim: Provide and install matching finish trim on each side of each suspended area.
11. Fire Tests: Complete system test including suspension, primed aluminum shall meet ASTM E 84 Class A.
12. Acceptable Product: Ceiling Plus Planx / Mirra Perforated ceiling panels as manufactured by USG Interiors; or approved equal by Gordon Inc., or ATAS International, Inc.

2.4 SUSPENSION SYSTEM

- A. ACT-1, ACT-2, ACT-3, and ACT-5 Ceiling grid: 15/16 inch exposed tee grid in white color. Acceptable products are:
 1. USG Donn DX/DXL Series
 2. Armstrong 15/16" Prelude XL.
 3. CertainTeed Classic Stab System
 4. OWA USA Cliq15/16"
- B. ACT-4 Ceiling grid: 15/16 inch fire-rated, double-web, hot-dipped galvanized steel body and aluminum cap in white color. Acceptable products are:
 1. USG Donn DXLA Series
 2. Armstrong Prelude Plus XL Fire Guard 15/16" Exposed Tee
 3. CertainTeed Classic Aluminum Capped Stab
- C. Edge moldings: Where not otherwise noted, at the perimeter of all ACT ceilings shall be grid system manufacturer's standard L-shape edge trim compatible with exposed grid system and color matched.
 1. Angle Moulding Item# 7884, or Item # 7809 for 15/16" grid.
- D. Hanger attachments: Of the most appropriate types for the specific receiving surfaces.
- E. Hangers: Unless otherwise noted, use soft temper, pre-stretched galvanized carbon steel wire, conforming to ASTM A641, with a yield stress load of at least three times design load, but not less than 12 gauge.
- F. Joint Sealer: One component acrylic latex, permanently elastic, non-staining, non-shrinking, non-migrating and paint able.
 1. Tremco, Beachwood OH; product, "Acoustical Sealant".
 2. United States Gypsum Company, Chicago IL; product "USG Acoustical Sealant".
 3. Pecora Corporation, Harleysville PA; product " AC-20 FTR".

2.5 METAL EDGE MOLDING AND TRIM

- A. Perimeter Trim System: An extruded aluminum trim used to create the transition between the perimeter and the ceiling plane. Commercial quality extruded aluminum alloy 6063

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trim channel, factory finished in baked polyester paint color to match intersecting grid system. Commercial quality aluminum unfinished t-bar connection clips; galvanized steel splice plates.

1. Manufacturer's:
 - a. Armstrong World Industries, Inc.: Axiom.
 - b. CertainTeed Ceilings: Approved equal.
 - c. USG Interiors, Inc.: Compasso Elite.
 - d. Gordon, Contura.
2. Material: Extruded aluminum.
3. Color: As selected by the Architect from the manufacturer's full range of standard colors.
4. Height: 8 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
- B. Beginning of installation means acceptance of site conditions.
- C. Coordination: Coordinate and schedule installation of linear metal ceiling system with work of other trades affected by this installation, with particular attention given to mechanical and electrical work required to be installed and operating before ceiling work can begin.

3.2 PREPARATION

- A. Carefully examine all receiving surfaces, to which attachments will be made hereunder, and determine the most practical way of making such attachments. Request Architect's approval of any attachment method, which differs from, that indicated on the approved shop drawings before proceeding with installation.
- B. Permit acoustical ceiling panel to reach room temperature and stabilized moisture content prior to installation.

3.3 INSTALLATION

- A. Locate system on room axis, leaving equal sized border units of not less than one-half tile width.
- B. Install all components of the suspended grid systems in accordance with the manufacturer's instructions, the approved shop drawings, conforming to ASTM C-636 requirements. Ensure a deflection not to exceed 1/360 span of 48-inch simple span.
- C. Install specified edge moldings wherever ceilings intersect a wall or partition surface, and around all items having any dimension of 4 inches or more, which penetrate the ceilings. Set moldings absolutely level, using as long lengths as practicable, and secure with fasteners recommended by manufacturer for the type of substrate.
 1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.
 2. Screw-attach moldings to substrate at intervals not over 16' o.c. and not more than 3' from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.

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- D. Install hanger attachments to overhead construction in accordance with the approved shop drawings, spacing the attachments not more than 48 inches on centers over location of each main tee member.
 - 1. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers to span the extra distance.
 - 2. Install hanger wire to attachments with triple twists.
- E. Install main tees parallel to the long dimension of each area, spacing the tees 48 inches on centers. Secure the bottom of hanger wires through slots in the main tee members and tie with triple twists. Level the main tees as the work progresses.
- F. Uniformly space the cross tees at 24 inches on centers, and secure the cross tees into the main tees as recommended by the system manufacturer.
- G. Fit acoustical ceiling panel units in place, free from damaged edges or other defects detrimental to appearance and function. Install acoustical ceiling panel level, in uniform plane, and free from twist, warp or dents.
 - 1. Field cut tegular type tile with a tegular reveal at all edge conditions. Touch up cut edge(s) with white paint to match ceiling tile.
 - 2. Provide two clips per ceiling panel in the following areas, installed on opposite sides of panel.
 - a. All Corridors, Lobbies, Vestibules and similar spaces
 - b. Locker Rooms.
 - c. Where additionally required by governmental agencies having jurisdiction, install retention clips.
- H. Acoustical material: Where acoustical material is required, install material across top of ceiling pans between support system members.

3.4 TOLERANCES

- A. Maximum variation from flat and level surface: 1/8 inch in 10 feet.
- B. Maximum variation from plumb of grid members caused by eccentric loads: 2 degrees.

3.5 CLEANING

- A. Properly clean surfaces of panels and open grids free from dirt and handling marks. Wherever surfaces cannot be cleaned by normal methods or have defects, remove and replace with new components.
- B. Metal panels: Clean painted panels with a nonabrasive, non-solvent-based commercial cleaner. A soft cotton cloth is recommended.
- C. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

END OF SECTION
