

SECTION 09 54 00 – SPECIALTY CEILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Section Includes:
 - 1. Linear metal baffle ceiling system **AC-21, AC-22**.
 - 2. Accessories: provide other necessary items including devices for attachment overhead construction, secondary members, splines, splices, connecting clips, wall connectors, wall angles required for a complete installation.
 - 3. Supplemental support framing: Provide fully engineered secondary framing as required to meet code, conforming to layout shown in drawings, to support direct-hung metal ceilings suspension system:
- C. Related Work:
 - 1. Division 05, Section 05 50 00 "Miscellaneous Metal Fabrications" for supplemental support framing.
 - 2. Division 09, Section 09 81 29 "Sprayed Acoustic Insulation".

1.2 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's descriptive literature, and recommendations and instructions for installation.
- B. Sustainable Design Submittals:
 - 1. Building Product Disclosure and Optimization – Sourcing of Raw Materials:
 - a. Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
 - b. Bio-based Materials: For bio-based products and materials other than wood, submit documentation of product data and testing results in compliance with LEED requirements.
 - c. Wood Products: Submit documentation of Forest Stewardship Council or USGBC equivalent certification.
 - d. Materials Reuse: For products that are salvaged, refurbished, or reused, include a statement indicating costs for each product.
 - e. Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
 - 1) Include statement indicating costs for each product having recycled content.
 - f. Regional Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.

- 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.
2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method v1.2 2017, using the applicable exposure scenario.
 - a. Adhesives and Sealants: For wet applied on-site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005, and rule amendment date of January 7, 2005.
 - b. Composite Wood: Submit documentation showing that wood used in the project has low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low emitting formaldehyde (ULEF) resins or no added formaldehyde resins.
 - c. For Ceiling products, submit documentation of VOC emissions testing compliance in the form of Greenguard Gold certification, SCS Indoor Advantage Gold certification or CDPH Standard Method v1.2 compliance verification.
- C. Shop Drawings: Submit shop drawings detailing assembly layout, suspension member sizes and thickness, and type. Include plans, elevations, sections, and details of steel components and connections. Show anchorage and accessory items.
 1. For installed products indicated to comply with design loads, include structural analysis data, for information only, signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Samples: Submit for each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 1. Linear Metal Components: Set of full size 12 inch (300 mm) long sample of each each type, finish, and color.
- E. Fabrication Engineering and Design Data Submittal: Submit design data of suspended support system, including attachment devices. Provide drawings and calculations signed and sealed by the qualified professional engineer responsible for the preparation.
 1. Linear Metal Ceilings: Support grid capable of withstanding imposed gravity loads and resisting seismic loads.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Lighting fixtures.
 2. Air outlets and inlets.
 3. Speakers.
 4. Sprinklers.
- B. Sustainable Design Submittals:
 1. Building Product Disclosure and Optimization – Environmental Product Declarations

- a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
2. Building Product Disclosure and Optimization – Material Ingredients
 - a. Material Ingredient Reporting: Submit documentation confirming chemical inventory of products to at least 0.1 % (1000ppm) with at least one of the following:
 - 1) Submit published manufacturer inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
 - 2) Submit documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
 - 3) Submit Declare product label indicating that all ingredients have been disclosed down to 1000 ppm or designated as Red List Free or Declared
 - 4) Living Product Challenge
 - 5) Product Lens Certification
 - 6) USGBC approved program.
 - b. Material Ingredient Optimization: Submit documentation confirming chemical inventory of products to at least 0.01 % (100ppm) and/or that has a compliant material ingredient optimization report with at least one of the following:
 - 1) Submit GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
 - 2) Submit third-party verified documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
 - 3) Submit third-party verified Cradle to Cradle v3 Material Health certificate at the Bronze Level or better
 - 4) Submit third-party verified Declare product label indicating that all ingredients have been disclosed down to 100 ppm
 - 5) Submit third-party verified documentation that product is Living Product Challenge certified with a Red List Free or LBC Red List Free Declare label.
 - 6) Submit documentation that product has a manufacturer prepared action plan with material inventory to at least 1000 ppm.
- C. Certificates:
 1. Furnish certification of materials and systems conforming to Specification requirements.
 2. Submit manufacturer's certification that suspension system is capable of supporting light fixtures, grilles and other indicated components.
 3. Furnish certification of fire endurance rating and flame spread index of fire rating organization.
- D. Field quality control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installer having minimum 5 years documented experience who is trained and certified in the substrate preparation and installation of tile.
- B. Source Limitations for Ceiling Components: Obtain tile of each type from single source or producer.

- C. Mockups: Build mockups to verify selections and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build a 25-foot square mockup of each type of ceiling system installation where directed by Architect.
 - 2. Build room corner mockups of the Gate and Boarding area to be constructed in the field include the following:
 - a. Two (2) types of metal baffle ceiling.
 - b. Transitions to other types of ceilings as specified in other sections.
 - c. Include mechanical and electrical devices, diffusers, and the like specified in Divisions 21, 22, 23, 26, 27, and 28.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at site.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original packaging with seals unbroken.
- B. Store grid cartons open at each end to stabilize moisture content prior to installation.
- C. Store materials under cover, keep dry.

1.6 ENVIRONMENTAL CONDITIONS

- A. Do not install suspended linear metal ceilings until building area is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead mechanical work is completed, tested and accepted.
- B. Permit wet work to dry prior to commencement of installation.
- C. Maintain humidity at 20 percent to 60 percent prior to, during and after installation.
- D. Maintain temperature between 50-100 degrees F minimum prior to, during and after installation.

1.7 COORDINATION

- A. Coordinate work with other trades affected by installation with particular attention to mechanical and electrical work.
- B. Coordinate location of hangers with other work.

1.8 EXTRA MATERIAL

- A. Furnish extra materials equal to 2 percent of metal grid area. Furnish suspension system components in amount sufficient to install extra grid units.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fabrication Engineering and Design Data: Engage a qualified professional engineer, as defined in Section 01 33 16, "Fabrication Engineering Design Data," to design attachment devices including comprehensive analysis using performance requirements and design criteria indicated.
- 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: 25 or less.
 - 2. Smoke Developed Index: 450 or less.
- C. Low-Emitting Materials:
 - 1. Adhesives and Sealants wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
 - 2. All adhesives and sealants wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01, Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."
 - 3. All ceiling panel products must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
 - 4. Provide non-structural composite wood products that contain either No Added Formaldehyde (NAF) resins or Ultra Low Emitting Formaldehyde (ULEF) resins per CARB ATCM or equivalent european evaluations criteria noted in Division 01 Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."
 - 5. Provide structural composite wood products tested per EN 717-1:2014 as compliant with emissions class E1. Structural composite wood, with no added urea-formaldehyde resins or surface treatments, and certified per the following: PS 1-09 or PS 2-10 for plywood, PS 2-10 for OSB, ASTM D 5446-13 for structural composite lumber.

2.2 MANUFACTURERS

- A. Manufacturer:
 - 1. Ceilings Plus, a division of USG Corporation, MCG - Barz – Perforated

2.3 LINEAR METAL BAFFLE CEILING SYSTEM

- A. General:
 - 1. All 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.
 - 2. The individual linear members are to be die formed from a single sheet of aluminum, to dimensions as noted on drawings, with integral top return and end flanges. Each individual linear aluminum members shall be straight and square within 1/32" over 10'. Twisting or bowing of linear members is not acceptable. Objectionable deflection will not be tolerated. No indentations, marks or defacing of the exposed surface of the metal ceiling panel will be allowed. Roll forming shall not be allowed.

3. 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 .032" thickness, or greater if required, so that the panel deflection does not exceed L/360.
4. Individual linear members shall be factory attached to torsion spring backer supports (cassette assemblies). Each panel (cassette) assembly shall have minimum two backer supports (three backer supports for lengths greater than 60"), creating a modular panel assembly with minimum 1/4" reveals between panel ends.
5. No fasteners of any kind shall be visible on exposed face surfaces of ceilings or support tees. Down-light openings, sprinkler holes and miscellaneous penetrations shall be carefully field cut as required.
6. End Profile: Linear component end joints shall be reveal condition unless specified otherwise integral enclosures. Linear members shall have integral ends in single piece.
7. Sound-Absorptive Fabric Layer: Provide manufacturer's acoustic fabric sized to fit and laminated to concealed surface of panel. Material shall be both non-flammable and sound-absorptive.
 - a. Achieve absorption value of a minimum of NRC 0.80. Provide independent accredited laboratory test results illustrating compliance with acoustical requirements as per ASTM C423.
 - b. Install acoustical pads to fit the cavity of the linear members, unless otherwise directed by the Architect.
8. Plenum shall be 100% accessible. Each cassette shall be removable. Progressive panel access is not acceptable. Heavy duty torsion springs and steel clip assemblies to be mounted to every cassette for downward access, without potential for damage to cassette face or hinge assembly. Hinge assembly shall be mounted to every cassette with minimum two flush to face, counter sunk chamfered fasteners. Attaching torsion spring directly to cassette with fastener will not be acceptable.
9. All linear components with visual exposure where row terminates shall have integral end returns.
10. Provide and install matching finish trim on each side of each suspended area, unless noted otherwise.

B. Metal Baffle **AC-21**:

1. Perforated bars.
2. Provide acoustical insert material for perforated bars.
3. Profile and member size and spacing: Refer to drawings.
4. Panel size: 2 feet length x 11 inches width x 4 inches height.
5. Finish: Manufacturer's standard polyester paint.
6. Color: Custom champagne color.

C. Metal Baffle **AC-22**:

1. Perforated bars.
2. Provide acoustical insert material for perforated bars.
3. Profile and member size and spacing: 2 inch x 6 inch (51 mm x 152 mm) 8 inch (203 mm) o.c.
4. Baffle size: 12 inches by 96 inches.
5. Finish: Manufacturer's standard polyester paint.
6. Color: White.

2.4 METAL SUSPENSION SYSTEMS - GENERAL

- A. Metal Suspension System Standard: Provide metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C635/C635M requirements.
 - 1. Main and cross runners to be Standard "Heavy Duty" tee bar (as per ASTM C635).
 - 2. Face of main and cross runners to be factory finished matte black unless noted otherwise.
 - 3. Face of main runners shall be factory slotted to receive torsion springs.
 - 4. Provide suspension system made from steel sheet with an average recycled content such that post-consumer recycled content plus one half or pre consumer content is not less than 25 percent.
- B. Suspension Systems: Provide complete suspensions systems with main runners, cross runners, hangers, trim molding, seismic retention clips, load resisting struts and other suspension components required to support ceiling and other ceiling supported construction.
- C. Attachment Devices: Size for 5 times the design load indicated in ASTM C635/C635M, Table 1, Direct Hung, unless otherwise indicated. Comply with seismic design requirements.
- D. Expansion Anchors: Fabricated from corrosion resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E488/E488M conducted by a qualified testing agency.
- E. Power Actuated Fasteners in Concrete: Are not permitted, unless approved by Owner in writing, a minimum 48-hours prior to use.
- F. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Stainless Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
 - 2. Size: Select wire diameter so its stress at 3 times the hanger design load indicated in ASTM C635/C635M, Table 1, Direct Hung, is less than yield stress of wire, but provide not less than 0.135 inch (3.5 mm) diameter wire.
- G. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust inhibitive paint.
- H. Angle Hangers: Angles with legs not less than 7/8-inch (22 mm) wide; formed with 0.04 inch (1.0 mm) thick, galvanized steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation; with bolted connections and 5/16 inch (8 mm) diameter bolts.

2.5 FINISHES - GENERAL

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Surface preparation of aluminum surfaces shall include cleaning and pre-treating of surface to comply with MMA 620-02, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Aluminum Substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces scheduled to receive suspended metal grid system for unevenness, irregularities and dampness.

3.2 PREPARATION

- A. Mark size and location for access provisions before beginning installation.
- B. Layout hanger channels to accommodate fittings and units of equipment which are to be placed after installation of grid system. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest adjacent hangers and related carrying channels as necessary to span required distance. Provide additional hangers and inserts as necessary.

3.3 INSTALLATION

- A. Install suspended metal linear ceiling systems in accordance with manufacturer's recommendations to produce finished ceiling true to lines and levels and free from warped, soiled or damaged grid.
- B. Place hangers independently of walls, columns, ducts, pipes, and conduit. Locate first hanger 6" from wall and space 3'-0" along carrying channel. Where carrying members are spliced, avoid visible displacement of longitudinal axis or face plane of adjacent members.
- C. Cope exposed flange of intersecting members in order that flange faces shall be flush, cope flanges of member supported by flange of other member.
- D. Do not support fixtures from main runners or cross runners if weight of fixture causes total dead load to exceed deflection capability. In such cases, support fixture loads by supplementary hangers located within 6" of each corner or support fixtures independently.
- E. Do not install fixtures so that main runners and cross runners will be eccentrically loaded. Provide stabilizer bars when fixture installation would produce rotation of runners.
- F. Install edge moldings at intersection of ceiling and vertical surfaces, or when panel edge would be exposed. Use maximum lengths, straight, true to line and level. Miter corners. Provide edge moldings at junctions with other ceiling finishes.

3.4 TOLERANCES

- A. Install ceiling systems in manner capable of supporting superimposed loads with maximum permissible deflection of L/360 of span and maximum surface deviation of 1/8" in 10'-0".
- B. Form expansion joints to accommodate ± 1 " movement and maintain visual closure.

3.5 ADJUSTMENTS

- A. Adjust any sags or twists which develop in suspended metal grid ceiling systems and replace any part which is damaged or faulty.

3.6 CLEANING

- A. Clean soiled or discolored unit surfaces after installation.
- B. Touch up scratches, abrasions, voids and other defects in finished surfaces.

END OF SECTION