PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes aluminum metal panels and concealed suspension systems for ceilings.

B. Related Sections include the following:
1. Division 1 Section “Sustainable Design Requirements”.
2. Division 9 Section "Acoustical Panel Ceilings" for ceilings consisting of mineral-base and glass-fiber-base acoustical panels and exposed suspension systems.
3. Divisions 13, 15, and 16 Sections for light fixtures, sprinklers, and air-distribution components.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.3 QUALITY ASSURANCE

A. The work of this section shall be performed by a company which specializes in the type of metal panel ceilings work required for this Project, with a minimum of 5 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.
1. Work shall be performed in compliance with Owner's insurance underwriters' requirements, and UL approvals and testing for materials, assemblies and procedures.

B. Manufacturer shall specialize in manufacturing the type of metal panel ceilings specified in this section, with a minimum of 5 years of documented successful experience, and have the facilities capable of meeting all requirements of Contract Documents as a single-source responsibility and warranty.

C. Source Limitations: Obtain each set of metal panels and suspension systems from one source with resources to provide products of consistent quality in appearance, physical properties, and performance.

D. Fire-Test-Response Characteristics: Provide metal panel ceilings with surface-burning characteristics complying with ASTM E1264 for Class A materials, as determined by testing identical products per ASTM E84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

E. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

G. Manufacturer’s identification tags or marks are not acceptable on surfaces which will remain exposed to view after installation.
1. Evidence of “patching” after removal of tags or marks is not acceptable.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide exterior metal panel ceilings capable of withstanding exterior exposure and the effects of gravity loads and the following loads and stresses without showing permanent deformation of ceiling system components including pans and suspension system; noise or metal fatigue caused by vibration, deflection, and displacement of ceiling units; or permanent damage to fasteners and anchors.

B. Thermal Movements: Provide exterior metal panel ceilings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   a. Temperature Change (Range): 100 deg F (55 deg C).

C. Seismic Performance: Provide metal panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
   1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580.
   2. California Building Code, 2010.

1.5 SUBMITTALS

A. Submit the following according to Conditions of the Construction Contract and Division 1 Specification Sections.

B. Shop Drawings: Shall clearly indicate but not be limited to:
   1. Reflected ceiling plans drawn accurately to scale and coordinating penetrations and ceiling-mounted items.
   2. Joint pattern.
   3. Ceiling suspension members.
   4. Method of attaching hangers to building structure.
   5. Ceiling-mounted items including light fixtures, air outlets and inlets, speakers, sprinkler heads, and access panels.
   6. Special moldings at walls, column penetrations, and other junctures with adjoining construction.

C. LEED Submittals:
   1. LEED Submittal: MRc4 list all materials with recycled content indicating material cost broken out by post-industrial (pre-consumer) and post-consumer content. Only include data for materials permanently installed on the project site.
   2. LEED Submittal: MRc5 – List all materials with regional content indicated the cost and percentage of each material or fraction of each material (by weight) that is extracted, harvested or recovered as well a manufactured within 500 miles of the project site – 100 Mission Street, San Francisco, CA 94103.

D. Product Data: For each type of product indicated.

E. Performance Data: For installed products indicated to comply with design loads and other criteria, include structural analysis and other analytical data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
   1. Panel pattern.
   2. Joint pattern.
   3. Ceiling suspension members.
   4. Method of attaching hangers to building structure.
      a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
   5. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
   6. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

G. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
   1. Metal Panel: Set of 12-inch- (300-mm-) square samples of each type, finish, color and pattern.
   2. Suspension System Members: 12-inch- (300-mm-) long Sample of each type.
   3. Exposed Molding and Trim: Set of 12-inch- (300-mm-) long Samples of each type, finish, and color.

H. Qualification Data: For professional engineer, installer and testing agency.

I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each metal panel ceiling.

J. Research/Evaluation Reports: For metal panel ceiling and components and anchor type.

K. Maintenance Data: For finishes to include in maintenance manuals.

L. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Owner, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.

M. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in Article 3 of General Conditions.

1.6 DELIVERY, HANDLING, STORAGE

A. Comply with General Conditions and Section 01600/Product Requirements.

B. Deliver metal panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install metal panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 COORDINATION

A. Coordinate layout and installation of metal panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 WARRANTY

A. Comply with General Conditions and Division 1 Section “Product Requirements”.

B. Manufacturer’s Warranty: Submit a written warranty executed by the manufacturer, agreeing to repair or replacement of acoustical panels that fail within the warranty period. Failures include, but are not necessarily limited to:
1. Ceiling Panels: Sagging, warping, rusting and manufacturer’s defects.
2. Grid System: Rusting and manufacturer’s defects.

PART 2 PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the Owner.

2.2 MANUFACTURERS

A. General: For the purpose of establishing the minimum functional, aesthetic and quality standards required for work of this section, products of the following manufacturer are specified:
1. Armstrong World Industries, Inc., Lancaster, Pennsylvania.

B. Substitutions: Comply with General Conditions using form in Division 1 Section “Substitution Request Form”.

C. Recycled Content: For materials containing post-industrial (pre-consumer) and/or post-consumer recycled content, Contractor shall document the cost and percentage (by weight) of each material broken out by post-industrial (pre-consumer) and post-consumer content.

D. Regional Content: For materials containing content that is extracted, harvested or recovered as well a manufactured within 500 miles of the project site – 101 First Street, San Francisco, CA 94103. Contractor shall document the cost and percentage (by weight) of each material that is regional.

2.3 METAL CEILING PANELS

A. Ceiling Panels:
1. Material: Aluminum, 0.016 inches thick.
2. Finish: Post-painted and powder-coated.
3. Color: White.
4. Size: Unframed nominal 24 inches x 24 inches x 1-1/2 inch; blade width 3/8 inch.

5. Interior Cell Size: 8".
6. Edge Profile: Lock-in detail for attachment to mounting rails and cross rails.
7. Flame Spread: ASTM E 1264; Class A.
8. Acceptable Product: MetalWorks Open Cell Lock-In, as manufactured by Armstrong World Industries.

B. Mounting Rails: 8 feet x 1-1/2 inch; blade width 3/8 inch.

C. Cross Rails: 2 feet x 1-1/2 inch; blade width 3/8 inch.

D. Mounting Rail Connectors.

E. Suspension Clips.

F. Accessories: Wall moldings, end moldings, and accessory panels available for sprinklers and lighting.

2.4 METAL SUSPENSION SYSTEMS

A. Metal Suspension Systems Standard: Provide ceiling manufacturer's standard metal suspension systems of types and finishes indicated that comply with applicable ASTM C635 requirements.

B. Suspension Systems: Provide systems complete with carriers, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, fixture adapters, and other suspension components required to support ceiling units and other ceiling-supported construction.

C. Attachment Devices: Size for 5 times the design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.
1. Cast-in-Place and Postinstalled Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E488 or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
   a. Type: Postinstalled expansion anchors.
   b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B633, Class Fe/Zn 5 (0.005 mm) for Class SC service condition (mild).
   c. Corrosion Protection: Stainless-steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchors.
2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E1190, conducted by a qualified testing and inspecting agency.

D. Wire Hangers, Braces, and Ties: Provide wire complying with the following requirements:
1. Zinc-Coated Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times the hanger design load (ASTM C635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.135-inch- (3.5-mm-) diameter wire.

E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples.
   1. Noticeable variations in the same piece are not acceptable.
   2. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Color-Coated Finish: Manufacturer's standard powder-coat baked paint finish complying with coating manufacturer's written instructions for surface preparation, pretreatment, application, baking, and minimum dry film thickness.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which metal panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of metal panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of metal panels to balance border widths at opposite edges of each ceiling.
   1. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION, GENERAL

A. General: Install metal panel ceilings to comply with ASTM C636 and seismic requirement indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   3. Where width of ducts and other construction within plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
      a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
   4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns.
      a. Connect hangers directly to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved.
      a. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
   6. Do not support ceilings directly from permanent metal forms or floor deck.
      a. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
   7. Do not attach hangers to steel deck tabs.
   8. Do not attach hangers to steel roof deck.
      a. Attach hangers to structural members.

9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of metal panel ceiling area and where necessary to conceal edges of metal panels.
   1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.66 m).
      a. Miter corners accurately and connect securely.
   2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install metal panels in coordination with suspension system and exposed moldings and trim.
   1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated.

3.4 CLEANING

A. Clean exposed surfaces of metal panel ceilings, including trim and edge moldings after removing strippable, temporary protective covering if any.
   1. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage.
   2. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

END OF SECTION