**SECTION 09 54 23**

**METAL PAN CEILINGS**

**METALWORKS Design Flex Tegular**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

**1.2 SUMMARY**

1. Section Includes:
   1. Exposed grid suspension system.
   2. Wire hangers, fasteners, main runners, cross tees, wall angle moldings and accessories.
2. Related Sections:
   1. Section 09 53 00 - Acoustical Ceiling Suspension Assembly
   2. Section 09 58 00 – Integrated Ceiling Assemblies
   3. Section 09 20 00 - Plaster and Gypsum Board
   4. Section 09 22 16 - Non-Structural Metal Framing
   5. Section 01 81 13 - Sustainable Design Requirements
   6. Section 01 81 19 - Indoor Air Quality Requirements
   7. Divisions 23 (15) - HVAC
   8. Division 26 (16) Sections - Electrical Work
3. Alternates
   1. Prior Approval: Unless otherwise provided for in the Contract documents, submit proposed product substitutions no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect’s review and acceptance. Approved products will be set forth by the Addenda. If a substitution is included in a Bid and is not approved by an Addendum, the specified products shall be provided as in place of the substitute without additional compensation.
   2. Submittals, which do not provide adequate data for the product evaluation, will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); panel design, size, composition, color, and finish; suspension system component profiles and sizes; compliance with the referenced standards.

**1.3 REFERENCES**

1. American Society for Testing and Materials (ASTM):
   1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
   2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot- Dip Process.
   3. ASTM A 1008 Standard Specification for Steel, Sheet, and Cold Rolled Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   4. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
   5. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
   6. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
   7. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   8. Underwriters Laboratories Incorporated
   9. ASTM E 580 Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.
   10. ASTM E 1264 Classification for Acoustical Ceiling Products.
   11. International Building Code
   12. ASHRAE Standard 62 1 2004 Ventilation for Acceptable Indoor Air Quality
   13. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010
   14. NFPA 70 National Electrical Code
   15. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
   16. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
   17. International Code Council-Evaluation Services Report - Seismic Engineer Report
       1. ESR 1308 - Armstrong T-Bar or Dimensional Suspension
   18. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings
   19. International Well Building Standard
   20. Mindful Materials
   21. Living Building Challenge

**1.4 SUBMITTALS**

1. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
2. Samples: Minimum 6-inch x 6-inch samples of specified acoustical panel; 8-inch-long samples of exposed wall molding and suspension system, including main runner and 4-foot cross tees.
3. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with or supported by the ceilings.
4. Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.  For acoustical performance, each carton of material must carry an approved independent laboratory classification, such as Underwriter’s Laboratory (UL), of NRC, CAC, and AC.
5. If the material supplied by the acoustical subcontractor does not have an independent laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion.  All products not conforming to manufacturer's current published values must be removed, disposed of, and replaced with complying product at the expense of the Contractor performing the work.

**1.5 QUALITY ASSURANCE**

1. Single-Source Responsibility: Provide ceiling panel units and grid components by a single manufacturer.
2. Fire Sprinklers: Ceiling systems may obstruct or skew the planned water distribution pattern of fire sprinkler. In addition to creating a delay or accelerating the activation of the sprinkler of fire detection system. Consult with a fire protection engineer for guidance
3. Fire Performance Characteristics: Identify ceiling components with appropriate markings of applicable testing and inspecting organization.
   1. Surface Burning Characteristics: As follows, assessed per ASTM E 84 and complying with ASTM E 1264 for Class A products.
      1. Flame Spread: 25 or less
      2. Smoke Developed: 50 or less
4. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

**1.6 DELIVERY, STORAGE, AND HANDLING**

1. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
2. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
3. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

**1.7 PROJECT CONDITIONS**

1. Space Enclosure:
2. Installation of MetalWorks™ ceiling and wall systems and MetalWorks custom suspension systems for interior applications shall be conducted where the temperature is between 32°F (0°C) and 120°F (49°C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. The ceiling panels and suspension system shall not be used to support any other material. MetalWorks ceiling and wall systems and MetalWorks custom suspension systems for interior applications cannot be used in exterior applications.

**1.8 WARRANTY**

1. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
   1. Acoustical Metal Panels: Sagging and warping
   2. Grid System: Rusting and manufacturer's defects
2. Warranty Period:
   1. Armstrong® MetalWorks ceiling and wall systems and MetalWorks custom suspension systems for interior applications are warranted to be free from defects in materials or factory workmanship for a period of one (1) year from the date of installation.

The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

**1.9 SUSTAINABLE MATERIALS**

1. Transparency: Manufacturers will be given preference when they provide documentation to support sustainable requirements for the following: Material ingredient transparency, Removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.
2. Health Product Declaration. The end use product has a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration open Standard.
3. Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).
4. Low Emitting products with VOC emissions data. Preference will also be given to manufacturers that can provide emissions data showing their products meet CDHP Standard Method v1.1 (Section 01350).
5. Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.
6. End of Life Programs/Recycling: Where applicable, manufacturers that provide the option for recycling of their products into new products at end-of-life through take-back programs will be preferred.
7. Products meeting LEED V4 requirements including:
   1. Storage & Collection of Recyclables
   2. Construction and Demolition Waste Management Planning
   3. Building Life-Cycle Impact Reduction
   4. Building Product Disclosure and Optimization Environmental Product Declarations
   5. Building Product Disclosure and Optimization Sourcing of Raw Materials
   6. Building Product Disclosure and Optimization Material Ingredients
   7. Construction and Demolition Waste Management

**1.10 MAINTENANCE**

1. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
   1. Ceiling Units: Furnish quality of full-size units equal to 2.0 percent of amount installed.
   2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 1.0 percent of amount installed.

**PART 2 – PRODUCTS**

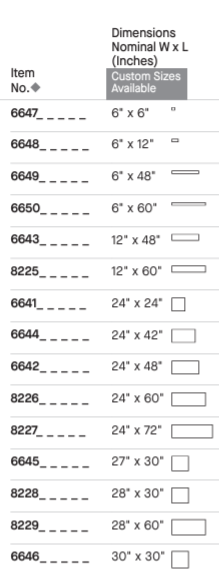
Attention Design Professional: Please edit Part 2 based on your project needs. Select product attributes and acceptable product item (s) that fit with the requirements of your project. Delete all items from the specification that do not relate to your project needs. Please refer to the Armstrong website for additional ceilings, suspension systems, perimeter trim options, and accessories. The related guide specifications for each of these items are available on the Armstrong website.

**2.1 MANUFACTURERS**

1. Basis of Design MetalWorks Design Flex - Tegular System:
   1. Armstrong World Industries, Inc.
2. Torsion Spring Suspension Systems:
   1. Armstrong World Industries, Inc.

**2.2.0 CEILING UNITS**

1. Panels:
   1. Surface Texture: Smooth
   2. Composition: Aluminum Metal – All panels are 0.040
   3. Colors: (Sustain)
2. Whitelume
3. Silverlume
4. Gun Metal
   1. Colors: (Non-Sustain)
      1. Black
   2. Edge Profile: Tegular 9/16”
   3. Light Reflectance (LR) White Panel: ASTM E 1477; Unperforated 0.75
   4. Recycle Content: 15%
   5. Material Ingredient Transparency: Declare Label, VOC
   6. Perforation Options: Unperforated M1; Perforated M15, M19
   7. Sizes: 9/16”



* 1. Acoustical Performance based on Noise Reduction Coefficient ASTM C 423 (NRC)

NRC w/ Accoustical Fleece NRS w 1” fiberglass infill

* + 1. M1 N/A N/A
    2. M15 .80 .90
    3. M19 75 .90
  1. Flame Spread: Class A
  2. Acceptable Product: MetalWorks Design Flex Tegular as listed and manufactured by Armstrong World Industries. When specifying or ordering, include the appropriate 6 or 7-digit perforation suffix and color suffix (e.g., 6 6 4 7 M 1 W H A ).

1. Accessories: *S*elect all that apply to your project

6099 Edge Cap for Cut tegular panels for 9/16” suspension systems

5823 BioAcoustic™ Infill Panel

8200T10 1” fiberglass infill bag

**2.2.1 SUSPENSION SYSTEMS**

1. Components: All main beams and cross tees shall be commercial quality hot dipped galvanized steel as per ASTM A653. Main beams and cross tees are double-web steel construction with 15/16-inch type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
   1. Structural Classification: ASTM C635 (Heavy Duty).
   2. Acceptable Product: Listed Below as manufactured by Armstrong World Industries, Inc.
      1. Suprafine XL
      2. Sihouette
      3. Interlude XL HRC
2. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
3. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least times-three design load, but not less than 12 gauge.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

1. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.
2. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

**3.2 PREPARATION**

1. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

**3.3 INSTALLATION**

1. Install suspension system and panels in compliance with ASTM C636, ASTM E580, with the approval of the authorities having jurisdiction, and in accordance with the Armstrong MetalWorks Installation Instructions.
2. Panels with certain product finishes or characteristics, e.g., Sequels™ or standard WHA, SIA, MYA painted are part of our MetalWorks™ FASTPeel ™ Panel which come standard with our easier-to-remove protective film.

**3.4 ADJUSTING AND CLEANING**

1. Replace damaged and broken panels.
2. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer’s instructions for cleaning and touch up of minor finish damage.

**END OF SECTION**