

## **SECTION 09 50 00**

### **On-Center Linear Lighting Acoustical Ceiling Integration**

#### **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**

###### **A. Section Includes**

1. Acoustical ceiling panels
2. Exposed grid suspension system
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings
4. Perimeter Trim

###### **B. Related Selections**

1. Section 09 51 00 - Acoustical Ceilings
2. Section 09 51 13 - Acoustical Fabric-Faced Panel Ceilings
3. Section 09 53 00 - Acoustical Ceiling Suspension Assemblies
4. Section 09 20 00 - Plaster and Gypsum Board
5. Section 02 42 00 - Removal and Salvage of Construction Materials
6. Divisions 23 - HVAC Air Distribution
7. Division 26 - Electrical
8. Section 26 51 13 Interior Lighting Fixtures, Lamps and Ballasts

###### **C. Alternates**

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted 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 of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.

2. Submittals that 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); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

### **1.3 REFERENCES**

#### **A. American Society for Testing and Materials (ASTM):**

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
9. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material
  - A. Armstrong Fire Guard Products
10. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
11. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
12. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation between Rooms Sharing a Common Ceiling Plenum
13. ASTM E 1264 Classification for Acoustical Ceiling Products

#### **B. International Building Code**

#### **C. ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality**

#### **D. NFPA 70 National Electrical Code**

#### **E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures**

#### **F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components**

G. International Code Council-Evaluation Services Report - Seismic Engineer Report

1. ESR 1308 – Armstrong® Ceilings Suspension Systems

H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Report

1. 0244 – Armstrong® Ceilings SingleSpan™ Acoustical Corridor Suspension System

I. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010

J. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

#### **1.4 SYSTEM DESCRIPTION**

Continuous/Wall-to-Wall

#### **1.5 SUBMITTALS**

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. 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.

C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with, or supported by the ceilings.

D. 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 of NRC, CAC, and AC.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's 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.

#### **1.6 QUALITY ASSURANCE**

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

2. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.

3. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

B. Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

C. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

#### **1.7 DELIVERY, STORAGE AND HANDLING**

A. 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.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

#### **1.8 PROJECT CONDITIONS**

A. Space Enclosure:

HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.

#### **1.9 ALTERNATE CONSTRUCTION WASTE DISPOSAL**

A. Ceiling material being reclaimed must be kept dry and free from debris

B. Contact the Armstrong® Recycle Center a consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant will provide assistance to facilitate the recycling of the ceiling.

C. Recycling may qualify for LEED Credits:

a. LEED 2009 - Category 4: Material and Resources (MR)

i. Credit MRc2: Construction Waste Management

b. LEEDv4 - MRp2 - Construction Waste Management Planning Qualifies as a material stream (non-structural) targeted for diversion. Ceilings will be source-separated and diverted through the Armstrong Ceiling Recycling Program.

c. LEEDv4-MRc5 -

i. Option 1: Divert ceilings to qualify for one of the 3 material streams (50%)

ii. Option 2: Divert ceilings to qualify for one of the 4 material streams (75%)

## **1.10 WARRANTY**

A. 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 Panels: Sagging and warping

2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:

1. Acoustical panels: Ten (10) years from date of substantial completion.

2. Grid: Ten (10) years from date of substantial completion.

3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is Thirty (30) years from date of substantial completion.

C. 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.

## **1.11 MAINTENANCE**

A. 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. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

A. Ceiling Panels:

1. Armstrong World Industries, Inc.

B. Suspension Systems:

1. Armstrong World Industries, Inc.

C. Suspension System Accessories:

1. Armstrong World Industries, Inc.

D. Lighting Fixture

1. BASO LENO
2. Axis Click

### **2.2 ACOUSTICAL CEILING UNITS** (select the appropriate ACT panel, suspension system and suspension system hub before finalizing the specification)

#### **A. Acoustical Panels Type Acoustical (Armstrong® Ceilings Calla® Panel Selection):**

A. Acoustical Panels Type AP

1. Surface Texture: Smooth
2. Composition: Mineral Fiber
3. Color: White
4. Size: Refer to drawings
5. Edge Profile: Square Tegalur 9/16IN for interface.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton 0.85.
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton 35.
8. Sabin: N/A
9. Articulation Class (AC): ASTM E 1111; 170
10. Flame Spread: ASTM E 1264; Class A (HPVA)
11. Light Reflectance White Panel: ASTM E 1477; 0.86
12. Dimensional Stability: HumiGuard Plus

13. Recycle Content: Post-Consumer - 3% Pre-Consumer Waste - 73%
13. Acceptable Product: Calla®, as manufactured by Armstrong® World Industries

**B. Acoustical Panels Type Acoustical (Lyra® Panel Selection):**

1. Surface Texture: Fine
2. Composition: Fiberglass
3. Color: White
4. Size: Refer to drawings
5. Edge Profile: Tegular 9/16" for interface.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, N/A
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, N/A
8. Flame Spread: ASTM E 1264; Class A
9. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.90
10. Dimensional Stability: HumiGuard Plus - 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. All wet work (plastering, concrete, etc) must be complete and dry.
11. Antimicrobial Protection
12. Acceptable Product: Armstrong® Ceilings Lyra®, as manufactured by Armstrong® World Industries

**C. Acoustical Panels Type Acoustical (Ultima® Panel Selection):**

1. Surface Texture: Fine
2. Composition: Mineral Fiber
3. Color: White
4. Size: 24'x 24"
5. Edge Profile: Tegular 9/16" for interface
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, N/A
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, N/A
8. Flame Spread: ASTM E 1264; Class A
9. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.90
10. Dimensional Stability: HumiGuard Plus - 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. All wet work (plastering, concrete, etc) must be complete and dry.
11. Recycle Content: Post-Consumer - 1% - 2% Pre-Consumer Waste - 76%
12. Acceptable Product: Armstrong® Ceilings Ultima®, as manufactured by Armstrong® World Industries

**D. Acoustical Panels Type Acoustical (Optima® Panel Selection):**

1. Surface Texture: Fine
2. Composition: Fiberglass
3. Color: White
4. Size: Refer to drawings
5. Edge Profile: Tegular 9/16" for interface.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, N/A
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, N/A
8. Flame Spread: ASTM E 1264; Class A
9. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.90
10. Dimensional Stability: HumiGuard Plus - 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. All wet work (plastering, concrete, etc) must be complete and dry.

11. Recycle Content: Post-Consumer - 1% - 2% Pre-Consumer Waste - 71%
12. Acceptable Product: Armstrong® Ceilings Optima®, as manufactured by Armstrong® World Industries

## **2.3. ACOUSTICAL SUSPENSIONS SYSTEM**

### **A. Acoustical Suspension System:**

#### **I. Armstrong® Ceilings Suprafine® Selection**

1. Composition: Hot-dipped Galvanized Steel
2. Color: White
3. Profile Height: 1-11/16in
4. Profile: PeakForm™ with SuperLock™ Main runner clip and XL² Stake-on end detail on Cross-tee
5. Flange" 9/16"
6. Acceptable Product: Suprafine® XL 9/16" Exposed Tee System as manufactured by Armstrong® World Industries.

#### **II. Armstrong® Ceilings Interlude® Selection**

1. Composition: Hot-dipped Galvanized Steel
2. Color: White
3. Profile Height: 1-11/16in
4. Profile: Square bulb with XL² Stake-on clips on Main runner and Cross-tee
5. Flange: 9/16" Interlude dimensional design
6. Acceptable Product: Interlude® XL 9/16" Dimensional Tee System as manufactured by Armstrong® World Industries.

#### **III. Armstrong® Ceilings Silhouette® 1/4" Selection**

1. Composition: Hot-dipped Galvanized Steel
2. Color: White
3. Profile Height: 1-3/4in
4. Edge Profile: for interface with Silhouette XL 9/16" Bolt Slot - 1/4" Reveal.
5. Flame Spread: ASTM E 1264;
6. Acceptable Product: Silhouette® XL 9/16" Bolt Slot - 1/4" Reveal, as manufactured by Armstrong® World Industries.

#### **IV. Armstrong® Ceilings Silhouette® 1/8" Selection**

1. Composition: Hot-dipped Galvanized Steel
2. Color: White
3. Profile Height: 1-3/4in
4. Edge Profile: for interface with Silhouette XL 9/16" Bolt Slot - 1/8" Reveal.
5. Flame Spread: ASTM E 1264;
6. Acceptable Product: Silhouette® XL 9/16" Bolt Slot - 1/8" Reveal, 76198 as manufactured by Armstrong® World Industries.

## **2.4. SUSPENSION SYSTEM ACCESSORIES**

### **A. Lighting Connector Bracket**

1. Composition: Hot-dipped Galvanized Steel
2. Color: Gray
3. Dimensions: 4" wide x 2" high
4. Edge Profile: XL clips for interface with Armstrong® Suspension Systems.



5. Acceptable Product: Lighting Connector Bracket (item number LCB4) as manufactured by Armstrong World Industries.

#### **B. TechZone Yoke**

1. Composition: Hot-dipped Galvanized Steel
2. Color: Gray
3. Dimensions: 4" wide x 8" high
4. Acceptable Product: TechZone® Yoke (item number TZYK) as manufactured by Armstrong® World Industries.

### **2.5 LIGHTING FIXTURE**

#### **A. BASO LENO**

1. Product/Manufacturer: BASO
2. Product Name: LENO
3. Size: nominal 4" wide LED linear light
4. Ceiling Grid Compatibility: Armstrong World Industries
5. Color: Finished Trim in white

#### **B. Axis Click**

1. Product/Manufacturer: Axis Lighting
2. Product Name: Click
3. Size: nominal 4" wide LED linear light
4. Ceiling Grid Compatibility: Armstrong World Industries
5. Color: Finished Trim in white

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

### **3.2 PREPARATION**

A. 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**

A. Follow manufacturer installation instructions.

B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

C. Suspend main beam from overhead construction with hanger wires spaced 4'-0" on center along the length of the main runner. Install hanger wires plumb and straight.

D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

### **3.4 ADJUSTING AND CLEANING**

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

C. Before disposing of ceilings, contact the Armstrong Recycling Center at 877-276-7876, select option #1 then #8 to review with a consultant the condition and location of building where the ceilings will be removed. The consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant will provide assistance to facilitate the recycle of the ceiling.