

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exposed suspension system.
 - 2. Trim and accessories.
 - 3. Acoustical lay-in panels.
 - 4. Seismic grid restraint.

1.2 DEFINITIONS

- A. CSTC (Ceiling Sound Transmission Class): The numerical rating of sound attenuation for the ceiling system between two rooms when installed over a barrier with a common plenum above and tested in accordance with AMA-1-II-1967.
- B. LR (Light Reflectance Coefficient): As determined by ASTM E 1264.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit data for each distinct suspension system and acoustical unit type indicated in accordance with Section 01 33 00 – Submittal Procedures. Include ceiling panels, suspension systems, insulation and seismic restraint.
- C. Samples: Submit the following:
 - 1. Verification samples:
 - a. Acoustical units: 12-inch-square samples of each type required.
 - b. Exposed suspension and trim elements: 12-inch-long samples of each type and finish required.
- D. Coordination Drawings: Submit reflected ceiling plans showing correlations as necessary between work of this section and work of other sections.
 - 1. Minimum drawing scale: 1/4 inch equals 1 foot.
 - 2. Show the following:
 - a. Ceiling suspension elements.
 - b. Hanger type and method of attachment to structure.
 - c. "Required Accessible Ceiling Tile" locations.
 - d. Light fixtures.
 - e. HVAC equipment, including maintenance clearances.
 - f. Fire suppression system components.
 - g. Loudspeakers.
 - h. Partitions.
 - i. Cable trays.

- E. Shop Drawings: Submit shop drawings showing location of main runners and cross tees, perimeter conditions, lighting fixtures, ventilation fixtures, and other items which penetrate the ceiling.
 - 1. Drawings shall list materials, dimensions, method and spacing of vertical and lateral hanger wires, methods of supporting ceiling where ducts or other work interfere, and other pertinent information.
 - 2. Show method of resisting horizontal forces required by the International Building Code for seismic zone of project.
- F. Availability Requirement Statement: Submit statement from manufacturer's verifying that ceiling panel types shown in documents will be readily available for up to ten years.

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics:
 - 1. Surface burning characteristics: Provide products having the following characteristics when tested in accordance with ASTM E 84:
 - a. Maximum flame spread: 25.
 - b. Maximum smoke developed: 50.
- B. Seismic Restraint: Design and construct seismic restraint system for suspended metal grid in accordance with IBC/SBC 2012.
- C. Department of Health Approval: Indicated Lay-in ceiling panels must be listed as approved by the Washington State Department of Health.

1.5 PROJECT CONDITIONS

- A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.
- B. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.
- C. Coordinate ceiling system installation with work of other sections as required, including the following:
 - 1. Light fixtures.
 - 2. HVAC equipment.
 - 3. Fire suppression system components.
 - 4. Loudspeakers.
 - 5. Partitions.
 - 6. Cable trays.
 - 7. Ceiling mounted medical equipment.
 - 8. Changes in plane, furring, etc.
- D. Within each space to receive specified products, do not begin installation until the following conditions are met:
 - 1. Work above ceilings has been finished, tested, and approved.

2. Space to receive ceiling system is properly enclosed and protected from weather.
 3. Any wet work within the space is dry.
- E. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

1.6 MAINTENANCE

- A. Extra Materials: After ceiling installation has been completed, deliver to the Owner replacement materials for materials installed. Furnish products that precisely match installed products. Protect with appropriate packaging and provide clear, legible labels.
1. Acoustical lay-in panels: Furnish full-sized panels in quantities not less than 1 percent of quantity of panels installed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements products that may be incorporated into the Work include:
1. Basis of Design: Armstrong World Industries.
 2. USG Corporation.
 3. CertainTeed.
 4. Chicago Metallic.
 5. Donn
 6. Or Approved Equal

2.2 ACOUSTICAL CEILING UNITS – GENERAL

- A. Standard for Acoustical Ceiling Units: Provide units conforming to applicable requirements of ASTM E 1264 for Class A materials.
- B. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.3 CEILING SUSPENSION SYSTEMS – GENERAL

- A. Provide suspension systems conforming to specified requirements and to requirements of ASTM C 635, 2009 IBC, ASCE 7-02, and CISCA standards. Exposed pop rivets may not be used.
- B. Colors: Provide indicated colors. Where color is not indicated, provide colors as selected by the Owner from manufacturer's complete set of standard colors.
- C. Finishes: Manufacturer's standard shop-applied finishes.
- D. Attachment Devices for Suspension System:

1. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, "Direct Hung" column.
 2. Deck inserts and hanger clips: Fabricate from hot-dip galvanized steel.
 3. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A 641, soft temper, with Class 1 coating, minimum 12 gage (0.106 inch diameter).
- E. Edge Moldings and Trim: Extruded aluminum or formed steel to match grid.
1. Provide profiles indicated.
 2. Edge trim profile: Nominal 1- by 1-inch angle trim approved for use with seismic grid end clips.
- F. Seismic Accessories:
1. Seismic Grid End Clips: Armstrong "BERC2" or approved equal.

2.4 LAY-IN ACOUSTICAL CEILINGS

- A. Acoustical Ceiling Tiles:
1. Basis of Design Product: Armstrong "Clean Room VL", unperforated.
 2. or Approved Equal. See Paragraph 2.1.A.
 3. Typical Size: 24 by 24 inches
 4. Ceiling Sound Transmission Class: Minimum CAC 35.
 5. Noise Reduction Coefficient: Minimum NRC 0.70
 6. Fire Rating: Class 1.
 7. Edge profile: Tegular.
 8. Color: White.
- B. Acoustical Ceiling Tiles: First Floor Corridor Ceiling – to match existing.
1. Basis of Design Product: Armstrong "Optima Vector 3900".
 2. Typical Size: 24 by 24 inches
 3. Color: White.

2.5 SUSPENSION SYSTEMS

- A. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
1. Basis of Design Product: 15/16" "Prelude" by Armstrong.
 2. Beam End Retaining Clip: Berc2 by Armstrong.
 3. or Approved Equal.
 4. Color: White

2.6 LATERAL FORCE BRACING

- A. Seismic Compression Struts: One of the following:
1. 25 gauge metal studs.
 - a. 1-5/8 inch: Up to 6'-2" length.

- b. 2-1/2 inch: Up to 10'-6" length.
 - 2. Thinwall conduit (EMT) per City of Seattle standards.
 - 3. Purpose-build telescoping strut such as USG "Telescoping Seismic Compression Post" or Chicago Metallic "Dina Strut."
- B. Splay Wires: Four 12-gage wires per seismic compression strut.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.
- B. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

3.2 PREPARATION

- A. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units that are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to reflected ceiling plans to greatest extent possible.

3.3 SUSPENSION SYSTEM INSTALLATION

- A. General:
 - 1. Conform to the requirements of ASTM C 636, manufacturer's installation instructions, and governing regulations.
 - 2. Install hangers plumb and supported solely by building structure or carrying channels. Do not allow hangers to contact any objects or materials in ceiling plenum that are not actual components of ceiling system.
 - a) Splay hangers only where necessary to avoid obstacles. Provide countersplaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
 - b) Install splay hangers or other means of seismic restraint as required to meet the requirements of ASTM E 580.
 - 3. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.
 - 4. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
 - 5. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.
- B. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.
- C. Seismic Provisions: Provide lateral force bracing for all ceilings except ceilings less than 1000 square feet in area that are surrounded by four walls, each of which is braced to structure.

1. Locate struts and splay wires at spacing not to exceed 12'-0" o.c. and not more than 6'-0" from each wall.
2. Positively attach compression strut to suspension main beam and to structure above.
3. Attach 4 splay wires to main beam at seismic compression strut. Array wires at 90 degrees to each other at an angle not exceeding 45 degrees from horizontal.

3.4 TRIM INSTALLATION

- A. Install edge moldings and trim units at acoustical ceiling borders, at locations indicated, and where required to cover acoustical unit edges.
 1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.
 2. Miter corners and align butt joints carefully to form tight hairline joints.
- B. Seismic Provisions:
 1. Attach grid to wall edge trim on two adjacent walls.
 2. On opposite walls, install seismic grid end clips to attach grid to wall edge trim.

3.5 LAY-IN PANEL INSTALLATION

- A. Panel Installation: Install acoustical panels for accurate fit with suspension system and trim members. Scribe and cut panels at ceiling perimeter and at obstructions to provide neat, precise fit.
 1. Square-edge panel installation: Provide installation with panel edges that are hidden from view, by suspension members or trim.

3.6 ADJUST AND CLEAN

- A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.
- B. Replace ceiling system components that are discolored or damaged in any way, in a manner that results in the ceiling system showing no evidence of replacement work.

END OF SECTION