

## SECTION 09511

### ACOUSTICAL PANEL CEILINGS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems.

##### 1.2 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
  - 1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
  - 2. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.
- C. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.
- D. LEED Submittal:
  - 1. Credit MR 2.1 and 2.2: Comply with Division 1 Section "Construction Waste Management."
  - 2. Product Data for Credit MR 4.1 and Credit MR 4.2: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
    - a. Include statement indicating costs for each product having recycled content.
  - 3. Credit MR 5.1: Product Data indicating location of material manufacturer for regionally manufactured materials.
    - a. Include statement indicating cost and distance from manufacturer to Project for each regionally manufactured material.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated for each designation in the following paragraphs of Part 2.

## 2.2 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
1. Where appearance characteristics of acoustical panels are indicated by referencing ASTM E 1264 pattern designations and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range of products that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- C. Water-Felted, Mineral-Base Acoustical Panels for Acoustical Panel Ceiling ACT-1: Where this designation is indicated, provide acoustical panels complying with the following:
1. Products: Available products include the following:
    - a. Armstrong Fine Fissured Second I, No. 1766.
    - b. Celotex Fine Fissured Designer Series, No. FFT-812
    - c. USG Radar ClimaPlus Face Cuts, Illusion Eight/12 No. 2854
  2. Classification: Panels fitting ASTM E 1264 for Type III, mineral base with painted finish; Form 2, water felted.
  3. Pattern: Panels fitting ASTM E 1264 pattern designation (description) C (perforated, small holes); E (lightly textured), K (surface scored creating 12 by 12 inch squares).
  4. Color: White.
  5. Light Reflectance Coefficient: Not less than LR 0.80.
  6. Noise Reduction Coefficient: NRC 0.55.
  7. Ceiling Attenuation Class: Not less than CAC 30.
  8. Edge Detail: Angled reveal, sized to fit flange of exposed suspension system members.
  9. Thickness: 3/4 inch (19 mm).
  10. Size: 24 by 48 inches (610 by 1220 mm).
- D. Water-Felted, Mineral-Base Acoustical Panels for Acoustical Panel Ceiling ACT-2: Where this designation is indicated, provide acoustical panels complying with the following:
1. Products: Available products include the following:
    - a. Armstrong Fine Fissured Second II, No. 1766.
    - b. Celotex Fine Fissured Designer Series, No. FFT-224
    - c. USG Radar ClimaPlus Face Cuts, Illusion Two/24 No. 2844
  2. Classification: Panels fitting ASTM E 1264 for Type III, mineral base with painted finish; Form 2, water felted.
  3. Pattern: Panels fitting ASTM E 1264 pattern designation (description) C (perforated, small holes); E (lightly textured), K (surface scored creating 24 by 24 inch squares).
  4. Color: White.
  5. Light Reflectance Coefficient: Not less than LR 0.80.
  6. Noise Reduction Coefficient: NRC 0.55.
  7. Ceiling Attenuation Class: Not less than CAC 30.
  8. Edge Detail: Angled reveal, sized to fit flange of exposed suspension system members.
  9. Thickness: 3/4 inch (19 mm).
  10. Size: 24 by 48 inches (610 by 1220 mm).

- E. Glass-fiber-base acoustical panels with membrane-faced overlay for acoustical panel ceiling ACT-3: Where this designation is indicated, provide acoustical panels complying with the following:
1. Products: Available products include the following:
    - a. Armstrong Optima Open Plan, No. 3254.
    - b. Celotex
    - c. USG
  2. Classification: Panels fitting ASTM E 1264 for Type XII, glass-fiber base with membrane-faced overlay; Form 2, cloth.
  3. Pattern: Panels fitting ASTM E 1264 pattern designation (description) E (lightly textured).
  4. Color: White.
  5. Light Reflectance Coefficient: Not less than LR 0.89.
  6. Noise Reduction Coefficient: NRC 1.00.
  7. Edge Detail: Square reveal, sized to fit flange of exposed suspension system members.
  8. Thickness: 1-1/2 inch (38 mm).
  9. Size: 24 by 24 inches (610 by 610 mm).

## 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Suspension System for Acoustical Panel Ceilings: Where this designation is indicated, provide acoustical panel ceiling suspension system complying with the following:
1. Products: Provide one of the following:
    - a. Armstrong: Centricitee Suprafine 9/16" Exposed Tee System (7500 series)
    - b. CBI USA, Inc.: Narrow System
    - c. Celotex: 9/16" Narrow Stab System
    - d. USG: Centricitee DXT 24 System; USG Interiors, Inc.
  2. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/653M, G01 (Z001) coating designation, with prefinished 9/16-inch- (14-mm-) wide metal caps on flanges; other characteristics as follows:
    - a. Structural Classification: Intermediate-duty system.
    - b. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
    - c. Face Design: Flush face.
    - d. Cap Material: Steel sheet.
    - e. Cap Finish: Painted white.
- C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
- D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
1. Postinstalled Powder-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 E 1190, conducted by a qualified testing and inspecting agency.

- E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
- F. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
  - 1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
  - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- G. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.
  - 1. Available Product: UHDC by Armstrong.

## 2.4 METAL EDGE MOLDINGS AND TRIM

- A. Available Manufacturers:
  - 1. Armstrong World Industries, Inc.
- B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with the following requirements:
  - 1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 (ASTM B 221M) for alloy and temper 6063-T5.
  - 2. Provide manufacturer's standard factory-applied finish for type of system indicated.
- C. Product: 4 inch trim channel, Axiom by Armstrong or approved substitute.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
  - 1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.

- 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 ceiling 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, countersplaying, or other equally effective means.
  3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  4. Where width of ducts and other construction within ceiling 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. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
  5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  6. 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. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
  8. Do not attach hangers to steel deck tabs.
  9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  10. 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. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical 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 mm in 3.6 m). Miter corners accurately and connect securely.
  2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
    - a. As indicated on reflected ceiling plans.

2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Paint cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
4. Install hold-down clips in areas within ten feet of exterior doors; space as recommended by panel manufacturer's written instructions, unless otherwise indicated or required.

END OF SECTION