

U N I V E R S I T Y of  
**HOUSTON**

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FACILITIES PLANNING AND CONSTRUCTION

**STARS REPORT 2022--SUSTAINABLE PROCUREMENT—SAMPLE MASTER SPECIFICATIONS**

ATTACHED ARE UH MASTER SPECIFICATIONS THAT BY CONTRACT GOVERN THE PURCHASE AND INSTALLATION OF TYPICAL INTERIOR COMPONENTS OF NEW CONSTRUCTION AND RENOVATION PROJECTS ON CAMPUS:

- 09 2900 GYPSUM BOARD
- 09 5113 ACOUSTICAL PANEL CEILINGS
- 09 6813 CARPET
- 09 9123 INTERIOR PAINTING

UH REQUIRES LEED CERTIFICATION OF NEW CAPITAL PROJECTS AND MAJOR RENOVATIONS. THE ATTACHED SAMPLE SPECIFICATIONS ADDRESS COMMON SUSTAINABLE DESIGN REQUIREMENTS, INCLUDING RECYCLED CONTENT, REGIONAL SOURCING, VOC CONTENT AND OTHER TOPICS.

THE FULL MENU OF UH MASTER SPECIFICATIONS IS AVAILABLE HERE: <https://www.uh.edu/facilities-planning-construction/vendor-resources/owners-design-criteria/master-specs/>

SUSTAINABLE DESIGN REQUIREMENTS ARE CODIFIED HERE: <https://www.uh.edu/facilities-planning-construction/vendor-resources/owners-design-criteria/master-specs/01-8114-sustainable-design-requirements---leed-v4-bd+c-11.2019.pdf>

AND HERE: <https://www.uh.edu/facilities-planning-construction/vendor-resources/owners-design-criteria/design-guidelines/design-guidelines-07-sustainable-design-jan2020-002.pdf>

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### SECTION 09 2900 - GYPSUM BOARD

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information.

Edit and finalize this Section, where prompted by Editor's notes, to suit Project specific requirements. Make selections for the Project at text identified in bold.

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
  - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Interior gypsum board.
  - 2. Exterior gypsum board for ceilings and soffits.
  - 3. Abuse Resistant Gypsum Board where indicated on Drawings

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1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

Retain paragraph B and associated subparagraphs below if Project is to be LEED v4 certified.

B. LEED Action Submittals (Projects authorized for LEED certification only):

1. Building Product Disclosure and Optimization:

a. Leadership Extraction Practices

- 1) Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
- 2) Provide details of bio-based material per Sustainable Agriculture Network's Sustainable Agriculture Standard or USDA certified bio-based product. Indicate cost, location of extraction, manufacture, and purchase of material.
- 3) Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
  - a) Include statement indicating costs for each product having recycled content.

b. Sourcing of Raw Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.

- 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.
- 2) Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.

2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method V1.1-2010, using the applicable exposure scenario.

- a. For paints, and coatings, wet applied, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure for Architectural Coatings or the South Coast Air Quality Management District (SCAQMD) Rule 113-2011.
- b. Adhesives and Sealants: For wet applied on site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005 and rule amendment date of January 7, 2005.
  - 1) Product Data: For installation adhesives, indicating VOC content.

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- c. Alternative tests for VOC above include ASTM D2369-10; ISO 11890 part 1; ASTM D6886-03; or ISO 11890-2.
  - d. Methylene Chloride and perchloroethylene may not be added to paints, coating, adhesive or sealants.
  - e. Provide General Emissions Evaluation certificates for adhesives, sealants showing compliance with California Department of Public Health v1.1 emissions testing or equivalent.
3. Laboratory Test Reports: For installation adhesives indicating compliance with requirements for low-emitting materials.
- C. Samples: For the following products:
1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

### 1.4 INFORMATIONAL SUBMITTALS

Retain paragraph A and associated subparagraphs below if Project is to be LEED v4 certified.

#### A. LEED Informational Submittals:

1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
  - a. Raw Material Sources and Extraction Reporting: Submit Raw materials supplier corporate Sustainability Reports (CSRs); documenting responsible extraction; including extraction locations, long term ecologically responsible land use, commitment to reducing environmental harms from extraction and manufacturing processes, and a commitment to meeting applicable standards or programs that address responsible sourcing criteria
    - 1) Submit manufacturers' self-declared reports
    - 2) Submit third party verified corporate sustainability reports (CSR) using one of the following frameworks"
      - a) Global Reporting Initiative (GRI) Sustainability Report
      - b) Organization for Economic Co-operation and Development (OECD)
      - c) Guidelines for Multinational Enterprises
      - d) UN Global Compact
      - e) ISO 26000
      - f) USGBC approved program.
2. Building Product Disclosure and Optimization - Material Ingredients
  - a. Material Ingredient Optimization: Submit manufacturer's Environmental Product Declaration (EPD) and at least one of the following:
    - 1) GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.

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- 2) Cradle to Cradle: Manufacturer's published literature for the product bearing the Cradle to Cradle logo.
  - 3) International Alternative Compliance Path - REACH Optimization
  - 4) Declare: Manufacturer's completed Product Declaration Form
  - 5) Other programs approved by USGBC
- b. Product Manufacturer Supply Chain Optimization: Submit documentation from manufacturers for products that go beyond material ingredient optimization as follows:
- 1) Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99 percent (by weight) of the ingredients used to make the building product or building material, and
  - 2) Are sourced from product manufacturers with independent third party verification of their supply chain that at a minimum verifies:
    - a) Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
    - b) Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
    - c) Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
    - d) Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
    - e) Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
    - f) Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain

### 1.5 QUALITY ASSURANCE

- A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 square feet in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Install mockups for the following:
    - a. Each level of gypsum board finish indicated for use in exposed locations.
  2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
  3. Simulate finished lighting conditions for review of mockups.

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4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

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2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :

- 1. Georgia-Pacific Gypsum LLC.
- 2. National Gypsum Company.
- 3. USG Corporation.
- 4. Substitutions: See Section 01 2500 "Substitution Procedures."

- B. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

- 1. Thickness: 1/4 inch.
- 2. Long Edges: Tapered.
- 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

- 1. Thickness: 1/2 inch.
- 2. Long Edges: Tapered.
- 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- D. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, Level 3.

- 1. Core: 5/8 inch, Type X.
- 2. Long Edges: Tapered.
- 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- E. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

- 1. Core: 5/8 inch, regular type or 5/8 inch, Type X.
- 2. Long Edges: Tapered.
- 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 SPECIALTY GYPSUM BOARD

- A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.

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1. Products: Subject to compliance with requirements, provide one of the following :
  - a. Georgia-Pacific Gypsum LLC; Fireguard C.
  - b. National Gypsum Company; Gold Bond Fire-Shield C.
  - c. USG Corporation; Firecode C Core.
  - d. Substitutions: See Section 01 2500 "Substitution Procedures."

B. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Products: Subject to compliance with requirements, provide one of the following :
  - a. Georgia-Pacific Gypsum LLC; DensArmour Plus.
  - b. National Gypsum Company; Gold Bond e2XP Interior Extreme.
  - c. Temple-Inland Inc; GreenGlass Interior Gypsum Board.
  - d. Substitutions: see Section 01 25 00 "Substitution Procedures."
2. Core: As indicated.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D3274.

C. Acoustically Enhanced Gypsum Board: ASTM C 1396/C 1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. National Gypsum Company; Sound Break.
  - b. Quiet Solution, Quiet Rock.
  - c. Substitutions: See Section 01 2500 "Substitution Procedures."
2. Core: As indicated.
3. Long Edges: Tapered.

**2.5 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS**

A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Georgia-Pacific Gypsum LLC; ToughRock Soffit Board.
  - b. National Gypsum Company; Gold Bond Brand Exterior Soffit Board.
  - c. USG Corporation; Sheetrock Exterior Gypsum Ceiling Board.
  - d. Substitutions: See Section 01 2500 "Substitution Procedures."
2. Core: As indicated.



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- B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Georgia-Pacific Gypsum LLC; Dens-Glass Gold.
    - b. National Gypsum Company; Gold Bond, e(2)XP.
    - c. USG Corporation; Securock Glass Mat Sheathing.
    - d. Substitutions: See Section 01 2500 "Substitution Procedures."
  - 2. Core: As indicated.
- C. Cellulose Fiber-Reinforced Gypsum Sheathing Board: ASTM C 1278/C 1278M, gypsum sheathing, with manufacturer's standard edges.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. USG Corporation; Fiberock Aqua-Tough.
    - b. Substitutions: See Section 01 2500 "Substitution Procedures."
  - 2. Type and Thickness: Regular, 1/2 inch thick.
  - 3. Size: 48 by 96 inches.

**2.6 TILE BACKING PANELS**

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; GlasRoc Tile Backer.
    - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
    - c. Substitutions: See Section 01 2500 "Substitution Procedures."
  - 2. Core: As indicated on Drawings.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or C1325, with manufacturer's standard edges.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Custom Building Products; Wonderboard.
    - b. National Gypsum Company, Permabase Cement Board.
    - c. USG Corporation; DUROCK Cement Board.
    - d. Substitutions: See Section 01 2500 "Substitution Procedures."

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2. Thickness: As indicated.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.7 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:
  - a. Cornerbead.
  - b. Bullnose bead.
  - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - d. L-Bead: L-shaped; exposed long flange receives joint compound.
  - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
  - f. Expansion (control) joint.
  - g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet, plastic, or rolled zinc.
2. Shapes:
  - a. Cornerbead.
  - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
  - a. Fry Reglet Corp.
  - b. Gordon, Inc.
  - c. Pittcon Industries.
  - d. Substitutions: See Section 01 2500 "Substitution Procedures."
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

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**2.8 JOINT TREATMENT MATERIALS**

- A. General: Comply with ASTM C 475/C 475M and the recommendations of both the manufacturers of panel products and of joint treatment materials for each application indicated. Comply with all Gypsum Association and manufacturer's recommendations regarding temperature and humidity before applying joint compound and finish materials to gypsum board and paperless gypsum board.
  
- B. Joint Tape:
  - 1. Interior Gypsum Board: 10-by-10 self-adhesive glass mesh.
  - 2. Exterior Gypsum Soffit Board: 10-by-10 self-adhesive glass mesh.
  - 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 self-adhesive glass mesh.
  - 4. Tile Backing Panels: As recommended by panel manufacturer.
  
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
    - a. Use setting-type compound for installing paper-faced metal trim accessories.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
  - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
  - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
  
- D. Joint Compound for Exterior Applications:
  - 1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
  - 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
  
- E. Joint Compound for Tile Backing Panels:
  - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
  - 2. Cementitious Backer Units: As recommended by backer unit manufacturer.
  - 3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

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**2.9 AUXILIARY MATERIALS**

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
  
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
  
- D. Sound Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from slag wool, or rock wool. Minimum 3 pcf density. ASTM E84, flame spread 0, smoke developed 0, or less.
  - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
  - 2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
  - 3. Provide manufacturer's standard sizes in thickness indicated. Provide one of the following:
    - a. Johns-Manville "Mineral Wool Sound Attenuation Fire Batts."
    - b. Owens Corning "Thermafiber UltraBatt."
    - c. Rockwool "AFB."
  
- E. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
    - b. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
    - c. USG Corporation; SHEETROCK Acoustical Sealant.
    - d. Substitutions: See Section 01 2500 "Substitution Procedures."

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2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- F. Partition End Closures: Continuous closed cell neoprene compressible filler complying with ASTM D1056; with pressure sensitive temporary positioning adhesive on both sides; thickness and width as shown, or as required to provide a complete sound seal at curtain wall mullions and glass curtain walls.
- G. Spot Grout: ASTM C475/C475M, setting-type joint compound recommended for spot grouting hollow metal door frames.
- H. Thermal Insulation: As specified in Section 07 2100 "Thermal Insulation."
- I. Vapor Retarder: As specified in Section 07 2100 "Thermal Insulation."
- J. Acoustic Box Pads (For Acoustic Control): Polybutene pads, 1/8 inch (3 mm) thick,
  1. Product: Lowery's Electrical Box Pads, Harry A. Lowery & Associates, Inc., or other approved by Architect.
- K. Fire Rated Box Pads: Putty Pads; moldable non-curing one component, intumescent, fire-rated material for through-penetration fire stop systems and sound attenuation systems; self-adhering; 1/8 inch (3 mm) thick minimum.
- L. Base-of-Wall PVC Moisture Barrier Trim: Extruded PVC, 1-3/4 inch high.
  1. Product: Waterguard USA <https://www.waterguard-usa.com> .

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Heat: When the outside temperature is below 55 degrees F, provide heat and maintain in all areas where the Work is to be performed. Provide heat continuously and uniformly at 55 degrees F from 48 hours prior to start of installation until dry wall application and joint treatment is completed. Do not start installation until windows are glazed and doors installed or openings temporarily closed. Use only heating methods approved in writing by the Owner.

3.3 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

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- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

**3.4 APPLYING INTERIOR GYPSUM BOARD**

**A. Single-Layer Application:**

- 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
- 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
- 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

**B. Multilayer Application:**

- 1. On ceilings, apply gypsum board indicated for base layers before applying face layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
- 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
- 3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
- 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws

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- C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- D. Curved Surfaces:
  - 1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
  - 2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

**3.5 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS**

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
  - 1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
  - 2. Fasten with corrosion-resistant screws.

**3.6 APPLYING TILE BACKING PANELS**

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- C. Water-Resistant Backing Board: Install where indicated with 1/4-inch gap where panels abut other construction or penetrations.
- D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.
- E. For large format tile installations provide maximum substrate variation not to exceed 1/8 inch in 10 ft. (3mm in 3048mm) and 1/16 inch in 2 ft. noncumulative along entire run of partition, when measured from surface high points with a straight-edge. No lippage allowed between adjacent panels. Coordinate with substrate panel installer and tile installer to correct deficiencies so that substrate is acceptable for large format tile installation.



3.7 INSTALLING TRIM ACCESSORIES AND AUXILLIARY MATERIALS

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners unless otherwise indicated.
  - 2. Bullnose Bead: Use at outside corners where indicated.
  - 3. LC-Bead: Use at exposed panel edges.
  - 4. L-Bead: Use where indicated.
  - 5. U-Bead: Use at exposed panel edges.
  - 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead: Use at exposed panel edges.
- E. Aluminum Trim: Install in locations indicated on Drawings.
- F. Base-of-Wall PVC Moisture Barrier Trim: Install in laboratories, restrooms, and residential projects and in locations indicated on Drawings in accordance with manufacturer's written directions.

3.8 INSTALLATION OF BOX PADS

- A. Cut openings in wallboard for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions. Maintain at least one full stud cavity between outlets (two regular placements between).
- B. Install acoustical box pads over all electrical and other type of device boxes in sound rated walls, including but necessarily limited to electrical junction boxes, electrical switch boxes, power outlet receptacle boxes, thermostat control boxes, telephone outlet boxes and television cable or antenna outlet boxes.
- C. Install fire rated box pads over all electrical and other type of device boxes and other items penetrating fire-rated walls, including but necessarily limited to electrical junction boxes, electrical switch boxes, power outlet receptacle boxes, thermostat control boxes, telephone outlet boxes, exit sign boxes, building clock boxes, and television cable or antenna outlet boxes.
- D. Install in accordance with the printed installation instructions of the manufacturer.

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- E. Brush or wipe dust and dirt from box surface.
- F. Center pad on back of box and mold around conduit or cable entering box. Mold pad around all sides covering all openings

**3.9 FINISHING GYPSUM BOARD**

**A. General:**

- 1. Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly
- 2. Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

**B. Prefill open joints, rounded or beveled edges, and damaged surface areas.**

**C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.**

**D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:**

- 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies
  - a. Typical Locations: Ceiling plenum areas, concealed areas, and where indicated on Drawings.
- 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges
  - a. Typical Locations: Panels that are substrate for ceramic or acoustical tile, electrical equipment rooms, communications rooms, and where indicated on Drawings.
- 3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges. Ensure joint compound is smooth and free from tool marks and ridges.
  - a. Typical Locations: Mechanical rooms and where indicated on Drawings.
- 4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges. Ensure joint compound is smooth and free from tool marks and ridges

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- a. Typical Locations: At panel surfaces that will be exposed to view unless otherwise indicated.
    - 1) Primer and its application to surfaces are specified in Section 09 9123 "Interior Painting."
  - 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply min. 1/16 in (1.6mm). skim coat of joint compound over entire surface where indicated for a Level "5" finish in accordance with "Recommended Specification Levels of Gypsum Board Finish" as developed by AWCI, CISCA, Gypsum Association and PDCA.
    - a. Typical Locations: Surfaces receiving gloss and semigloss enamels and other surfaces subject to severe lighting and where indicated on Drawings.
      - 1) Primer and its application to surfaces are specified in Section 09 9123 "Interior Painting."
  - E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
  - F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
  - G. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- 3.10 PROTECTION
- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
  - B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
  - C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
    - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
    - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 2900

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### SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information.

Edit and finalize this Section, where prompted by Editor's notes, to suit Project specific requirements. Make selections for the Project at text identified in bold.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
  - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

##### 1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

##### 1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.

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D. NRC: Noise Reduction Coefficient

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

[Retain paragraph and associated subparagraphs below if Project is to be LEED v4 certified.](#)

B. LEED Action Submittals (Projects authorized for LEED certification only):

1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:

a. Leadership Extraction Practices

- 1) Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
- 2) Bio-Based Materials: Meeting the sustainable Agriculture Network's Sustainable Agriculture Standard and tested per ASTM D6866.
- 3) Wood Products: Certified by Forest Stewardship Council or USGBC approved equivalent.
- 4) Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
  - a) Include statement indicating costs for each product having recycled content.

b. Sourcing of Raw Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.

- 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.
- 2) Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material

2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method V1.1-2010, using the applicable exposure scenario.

- a. Paints, and Coatings: For wet applied on site products, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3,-2011.
- b. Adhesives and Sealants: For wet applied on site products, submit printed statement showing compliance with the applicable chemical content

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requirements of SCAQMD Rule 1168, effective July 1, 2005 and rule amendment date of January 7, 2005.

- c. Alternative tests for VOC above include ASTM D2369-10; ISO 11890 part 1; ASTM D6886-03; or ISO 11890-2.
  - d. Methylene Chloride and perchloroethylene may not be added to paints, coating, adhesive or sealants.
3. Laboratory Test Reports: For installation adhesives indicating compliance with requirements for low-emitting materials.

Retain "Samples" Paragraph below for single-stage Samples, with a subordinate list if applicable. Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs for two-stage Samples.

- C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- D. Samples for Initial Selection: For components with factory-applied color finishes.
- E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Suspended ceiling components.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Items penetrating finished ceiling including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Sprinklers.
  - 4. Perimeter moldings.
- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.

Retain paragraph and associated subparagraphs below if Project is to be LEED v4 certified.

- D. Informational LEED Submittals:

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1. Building Product Disclosure and Optimization - Environmental Product Declarations
  - a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
2. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
  - a. Raw Material Sources and Extraction Reporting: Submit Raw materials supplier corporate Sustainability Reports (CSRs); documenting responsible extraction; including extraction locations, long term ecologically responsible land use, commitment to reducing environmental harms from extraction and manufacturing processes, and a commitment to meeting applicable standards or programs that address responsible sourcing criteria
    - 1) Submit manufacturers' self-declared reports
    - 2) Submit third party verified corporate sustainability reports (CSR) using one of the following frameworks:
      - a) Global Reporting Initiative (GRI) Sustainability Report
      - b) Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
      - c) UN Global Compact
      - d) ISO 26000
      - e) USGBC approved program.
3. Building Product Disclosure and Optimization - Material Ingredients
  - a. Material Ingredient Optimization: Submit at least one of the following:
    - 1) GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
    - 2) Cradle to Cradle: Manufacturer's published literature for the product bearing the Cradle to Cradle logo, with gold or platinum certification.
    - 3) International Alternative Compliance Path - REACH Optimization
    - 4) Declare: Manufacturer's completed Product Declaration Form
    - 5) Other programs approved by USGBC
  - b. Product Manufacturer Supply Chain Optimization: Submit documentation from manufacturers for products that go beyond material ingredient optimization as follows:
    - 1) Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material, and
    - 2) Are sourced from product manufacturers with independent third party verification of their supply chain that at a minimum verifies:
      - a) Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available

hazard, exposure and use information to identify those that require more detailed evaluation

- b) Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
- c) Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
- d) Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
- e) Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
- f) Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain.

E. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

F. Field quality-control reports.

#### 1.6 CLOSEOUT SUBMITTALS

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

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS (ATTIC STOCK)

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Acoustical Ceiling Panels: Full-size panels equal to 5 percent of quantity installed, rounded to the nearest full box.
- 2. Suspension-System Components: Quantity of each exposed component equal to 5 percent of quantity installed.
- 3. Hold-Down Clips: Equal to 5 percent of quantity installed.
- 4. Impact Clips: Equal to 5 percent of quantity installed.

[Include Article below if Project has specialty ceilings or is critical enough to require mockups. Indicate location of mockups on Drawings as required.](#)

#### 1.8 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

- 1. Build mockup of typical ceiling area as shown on Drawings.



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2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical 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.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical 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.

"Pressurized Plenums" subparagraph below is according to Cisca's recommendations for cleaning duct system and protecting ceiling units in pressurized plenums from damage and soiling caused by blowing dirt and dust that may be present when duct system is first operated.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  2. Smoke-Developed Index: 50 or less.

Retain "Fire-Resistance Ratings" Paragraph below only if products specified are part of a fire-resistance-rated assembly. Indicate rating, testing agency, and testing agency's design designation on Drawings.

- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

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1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- C. In areas where gypsum board partitions are dependent on metal suspension systems for lateral support, design and install suspension system components to sustain the imposed load from the completed partition system including a minimum positive and negative pressure of 5 lbf/sq. ft. normal to the plane of the wall.

2.2 ACOUSTICAL PANELS, GENERAL

- A. Low-Emitting Materials: Acoustical panel ceilings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Source Limitations:
  1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
  2. Suspension System: Obtain each type from single source from single manufacturer.
- C. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- D. 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 NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.
- E. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

For Projects with more than one type of acoustical panel copy the Article below, provide an unique designation consistent with that on the Drawings and list the basis-of-design product and its related physical attributes.

2.3 ACOUSTICAL PANELS<: ACT-1>

Verify with Owner's representative that the basis-of-design product named in the Paragraph below is appropriate for the Project.

- A. Basis-of-Design Product—Offices, Classrooms, Conference Rooms, Corridors, Closed Spaces
  1. Subject to compliance with requirements, provide Armstrong World Industries, Inc. Ultima, Beveled Tegular 15/16, or comparable product by one of the following:
    - a. CertainTeed Corp.
    - b. USG Interiors, Inc.; Subsidiary of USG Corporation.

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2. See Section 01 2500 "Substitution Procedures."

Do not assume that every combination of fire-resistance rating, classification, pattern, color, light reflectance, acoustical rating, edge detail, thickness, and size listed under each product description is available. Before retaining salient characteristics, verify availability with manufacturers.

Retain option in "Classification" Paragraph below along with permitted fire-resistance-rated suspension system if fire-rated assembly is required for Project. Indicate rating, testing agency, and testing agency's design designation on Drawings.

- B. Classification: Provide[ **fire-resistance-rated**] panels complying with ASTM E 1264 for type, form, and pattern as follows:
  - 1. Type and Form: Type IV, mineral fiber base with membrane-faced overlay; Form 2, cloth.
  - 2. Pattern: E (lightly textured).
- C. Color: White.
- D. Recycled Content: Not less than 85 percent.
- E. LR: Not less than 88 percent.
- F. NRC: Not less than 0.75.
- G. CAC: Not less than 35.
- H. AC: N/A.
- I. Edge/Joint Detail: Reveal sized to fit flange of exposed suspension-system members.
- J. Thickness: 3/4 inch.
- K. Modular Size: 24 by 24 inches.
- L. 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.

2.4 ACOUSTICAL PANELS<: ACT-2>

Verify with Owner's representative that the basis-of-design product named in the Paragraph below is appropriate for the Project.

- A. Basis-of-Design Product—Open Plan Areas:

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1. Subject to compliance with requirements, provide Armstrong World Industries, Inc. Optima, Square Tegular 15/16, or comparable product by one of the following:
  - a. CertainTeed Corp.
  - b. USG Interiors, Inc.; Subsidiary of USG Corporation.
2. See Section 01 2500 "Substitution Procedures."

Do not assume that every combination of fire-resistance rating, classification, pattern, color, light reflectance, acoustical rating, edge detail, thickness, and size listed under each product description is available. Before retaining salient characteristics, verify availability with manufacturers.

Retain option in "Classification" Paragraph below along with permitted fire-resistance-rated suspension system if fire-rated assembly is required for Project. Indicate rating, testing agency, and testing agency's design designation on Drawings.

- B. Classification: Provide[ **fire-resistance-rated**] panels complying with ASTM E 1264 for type, form, and pattern as follows:
  1. Type and Form: Type IV, mineral fiber base with membrane-faced overlay; Form 2, cloth.
  2. Pattern: E (lightly textured).
- C. Color: White.
- D. Recycled Content: Not less than 70 percent.
- E. LR: Not less than 88 percent.
- F. NRC: Not less than 0.90.
- G. CAC: Not less than 26.
- H. AC: Not less than 200.
- I. Edge/Joint Detail: Reveal sized to fit flange of exposed suspension-system members.
- J. Thickness: 1 inch.
- K. Modular Size: 24 by 24 inches.
- L. 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.

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2.5 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

Retain "High-Humidity Finish" Subparagraph below if required. Finish is generally applicable to hot-dip galvanized steel with G60 (Z180) or greater coating and aluminum systems with anodized finish. ASTM C 635/C 635M requires salt-spray testing and high-humidity testing. On Drawings, show where high-humidity finishes are required.

- 1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated.

"Anchors in Concrete" Subparagraph below does not apply to power-actuated fasteners. Delete if no anchorage to concrete is required or if power-actuated fasteners are acceptable. Verify safety factor with Project's structural engineer. Revise testing methods below if required by authorities having jurisdiction.

- 1. 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]** <Insert safety factor> times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

Retain an option in "Type" Subparagraph below; verify suitability with Project's structural engineer.

- a. Type: **[Cast-in-place]** **[Postinstalled expansion]** **[Postinstalled bonded]** anchors.

Retain one of three "Corrosion Protection" subparagraphs below or, if more than one is required, indicate by inserting location of each on Drawings. Zinc plating of mild class indicated protects against corrosion from an indoor atmosphere with rare condensation and subject to minimum wear or abrasion; revise thickness to suit more corrosive conditions or use stainless steel or nickel-copper alloy, depending on conditions. If postinstalled expansion anchors are used to attach nickel-copper-alloy wire hangers and braces, consider retaining nickel-copper anchors after verifying availability with manufacturers.

- b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
- c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.

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- d. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.

Retain "Power-Actuated Fasteners in Concrete" Subparagraph below if power-actuated fasteners are allowed. Verify safety factor with Project's structural engineer.

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]** <Insert safety factor> times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

Retain one of "Zinc-Coated, Carbon-Steel Wire," "Stainless-Steel Wire," or "Nickel-Copper-Alloy Wire" subparagraphs below unless more than one type of wire is required. If more than one type of wire is required, indicate location of each on Drawings. See Evaluations for discussion on corrosion resistance of hangers and fasteners. Revise hangers to strap type if required by authorities having jurisdiction or by local union regulations.

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.

Retain second option in "Size" Subparagraph below if required by authorities having jurisdiction or if desired for extra security and quality (including corrosion allowance). Because large sizes are difficult to work with, their use could result in poor leveling tolerance.

4. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than **[0.106-inch-]** **[0.135-inch-]** <Insert dimension> diameter wire.

- E. Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate lateral forces.

- F. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.

Retain "Impact Clips" Paragraph below if required. Indicate location on Drawings or by inserts.

- G. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

Retain "Clean-Room Gasket System" Paragraph below if required. Verify, with manufacturers, product availability and compatibility of gasket type with panels and suspension system specified. Indicate location on Drawings or by inserts.

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- H. Clean-Room Gasket System: Where indicated, provide manufacturer's standard system, including **[manufacturer's standard]** **[closed-cell PVC]** **[neoprene]** **[antimicrobial]** gasket and related adhesives, tapes, seals, and retention clips, designed to seal out foreign material from and maintain positive pressure in clean room.

2.6 METAL SUSPENSION SYSTEM Type 1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc. Silhouette XL 1/8 inch Reveal, or comparable product by one of the following:
  - 1. CertainTeed Corp.
  - 2. USG Interiors, Inc.; Subsidiary of USG Corporation.
  - 3. Substitutions: See Section 01 2500 "Substitution Procedures."
- B. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 9/16-inch- wide metal caps on flanges.
  - 1. Structural Classification: Heavy-duty system.
  - 2. End Condition of Cross Runners: butt-edge type.
  - 3. Face Design: Flanges formed with an integral center reveal.
  - 4. Cap Material: Steel cold-rolled sheet.
  - 5. Cap Finish: Painted white.

2.7 METAL SUSPENSION SYSTEM Type 2

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc. Suprafine XL, or comparable product by one of the following:
  - 1. CertainTeed Corp.
  - 2. USG Interiors, Inc.; Subsidiary of USG Corporation.
  - 3. Substitutions: See Section 01 2500 – Substitution Procedures.
- B. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 9/16-inch- wide metal caps on flanges.
  - 1. Structural Classification: Heavy-duty system.
  - 2. End Condition of Cross Runners: butt-edge type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material: Steel cold-rolled sheet.
  - 5. Cap Finish: Painted white.

## 2.8 METAL EDGE MOLDINGS AND TRIM

Retain "Manufacturers" Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
1. Armstrong World Industries, Inc.
  2. CertainTeed Corp.
  3. USG Interiors, Inc.; Subsidiary of USG Corporation.
  4. Substitutions: See Section 01 2500 "Substitution Procedures."
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
  2. 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.
  3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

## 2.9 ACOUSTICAL SEALANT

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
1. Acoustical Sealant for Exposed and Concealed Joints:
    - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
    - b. USG Corporation; SHEETROCK Acoustical Sealant.
  2. Acoustical Sealant for Concealed Joints:
    - a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
    - b. Pecora Corporation; AIS-919.
    - c. Tremco, Inc.; Tremco Acoustical Sealant.
- B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.



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1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical 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 acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

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

**3.3 INSTALLATION**

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

[Retain "Fire-Rated Assembly" Subparagraph below if applicable.](#)

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- 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.

[Retain option in first subparagraph below only if fire-resistance-rated ceilings are retained.](#)

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2. 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.
3. 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.
4. 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 and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.

Retain first subparagraph below unless attaching to the roof deck is permitted by the structural engineer and authorities having jurisdiction. Revise if structural members are spaced too far apart for hangers and another method is required. For alternatives that may need to be detailed on Drawings, consult structural engineer and see CISCA's guidelines.

8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- 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. Apply acoustical sealant where required on drawings in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
  3. 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 fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  2. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
  3. Paint cut edges of panel 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 indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.

Retain first subparagraph below for clean-room requirements.

5. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.

Retain subparagraph below for fire-resistance-rated assemblies.

6. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements.
1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.

Verify loadings in two subparagraphs below with structural engineer based on ceiling loadings and seismic zone where Project is located. CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies - Seismic Zones 3 & 4" requires hanger wire attachment devices to be "capable of supporting 100 lbf (445 N)."

- a. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled

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anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.

- b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- C. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

**3.5 CLEANING**

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 5113

SECTION 09 6813 – CARPET

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information.

Edit and finalize this Section, where prompted by Editor's notes, to suit Project specific requirements. Make selections for the Project at text identified in bold.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
  - 2. The University of Houston's Supplemental General Conditions and Special Conditions for Construction.

1.2 SUMMARY

- A. This section covers the specification standards for modular and broadloom carpet. It includes construction, submittals, installation and warranty information regarding both modular and broadloom carpets.

1.3 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: During a regular scheduled construction meeting where a UH Project Manager is in attendance, address the following items prior to the installation of modular or broadloom carpet.

1. Review methods and procedures related to modular and broadloom carpet installation including, but not limited to, the following:
  - a. Review delivery, storage, and handling procedures.
  - b. Review ambient conditions and ventilation procedures.
  - c. Review subfloor preparation procedures.
  - d. Review of submitted installation drawings indicating all carpets on project, patterns and/or layouts, seaming diagrams and flooring transitions.

#### 1.4 ACTION SUBMITTALS

##### A. Product Data

1. Include manufacturer's written specification and warranty information in its entirety regarding the specified carpet to be installed on the Project. The specification shall clearly state the manufacturer's name, style/collection, pattern and color of the product. It shall also include all physical attributes (e.g. durability, fade resistance) of the product within the specification.
2. Include installation recommendations for each type of substrate related to the project. All installations shall adhere to the manufacturer's recommendations.

[Retain paragraph and associated subparagraphs below if Project is to be LEED v4 certified.](#)

##### B. LEED Action Submittals

1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
  - a. Leadership Extraction Practices
    - 1) Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
    - 2) Provide details of biobased material per Sustainable Agriculture Network's Sustainable Agriculture Standard or USDA certified biobased product. Indicate cost, location of extraction, manufacture, and purchase of material.
    - 3) Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
      - a) Include statement indicating costs for each product having recycled content.
  - b. Sourcing of Raw Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.
    - 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.

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- 2) Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
  2. Indoor Environmental Quality, Low Emitting Materials: Building products must be tested and compliant with the following low-emitting material criteria as applicable.
    - a. Paints, and Coatings: For wet applied on site products, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3,-2011.
    - b. Adhesives and Sealants: For wet applied on site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005 and rule amendment date of January 7, 2005.
      - 1) Product Data: For installation adhesives, indicating VOC content.
    - c. Alternative tests for VOC above include ASTM D2369-10; ISO 11890 part 1; ASTM D6886-03; or ISO 11890-2.
    - d. Methylene Chloride and perchloroethylene may not be added to paints, coating, adhesive or sealants.
    - e. Carpeting: Submit documentation of VOC emissions testing compliance for carpet products in the form of Carpet and Rug Institute (CRI) Green Label Plus certification or CDPH Standard Method v1.1 compliance verification.
    - f. Provide General Emissions Evaluation certificates for adhesives, sealants showing compliance with California Department of Public Health v1.1 emissions testing or equivalent.
  3. Laboratory Test Reports: For installation adhesives indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings, to Include the following details:
1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  2. Type of subfloor.
  3. Type of installation.
  4. Carpet Specifications.
  5. Pattern type, location, and direction.
  6. Pile direction.
  7. Type, color, and location of insets and borders.
  8. Type, color, and location of edge, transition, and other accessory strips.
  9. Transition details to other flooring materials.
  10. Carpet type, color, and dye lot.
  11. Locations where dye lot changes occur.
  12. Transition details to other flooring materials.

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- D. Samples: For each of the following products and for each color and texture required. Label each sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in Schedules.
1. Carpet Tile: (2) - Full-size Samples.
  2. Broadloom: (2) - 12 inch square Samples.
  3. Exposed edge, Transition strips and other accessory stripping: 12 inch long sample.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: Tests performed by a qualified testing agency on the specified products.

[Retain paragraph and associated subparagraphs below if Project is to be LEED v4 certified.](#)

- C. LEED Informational Submittals:
1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
    - a. Raw Material Sources and Extraction Reporting: Submit Raw materials supplier corporate Sustainability Reports (CSRs); documenting responsible extraction; including extraction locations, long term ecologically responsible land use, commitment to reducing environmental harms from extraction and manufacturing processes, and a commitment to meeting applicable standards or programs that address responsible sourcing criteria
      - 1) Submit manufacturers' self-declared reports
      - 2) Submit third party verified corporate sustainability reports (CSR) using one of the following frameworks"
        - a) Global Reporting Initiative (GRI) Sustainability Report
        - b) Organization for Economic Co-operation and Development (OECD)
        - c) Guidelines for Multinational Enterprises
        - d) UN Global Compact
        - e) ISO 26000
        - f) USGBC approved program.
  2. Building Product Disclosure and Optimization - Material Ingredients
    - a. Material Ingredient Optimization: Submit manufacturer's Environmental Product Declaration (EPD) or at least one of the following:
      - 1) GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
      - 2) Cradle to Cradle: Manufacturer's published literature for the product bearing the Cradle to Cradle logo.
      - 3) International Alternative Compliance Path - REACH Optimization



- 4) Declare: Manufacturer's completed Product Declaration Form
- 5) Other programs approved by USGBC
- b. Product Manufacturer Supply Chain Optimization: Submit documentation from manufacturers for products that go beyond material ingredient optimization as follows:
  - 1) Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99 percent (by weight) of the ingredients used to make the building product or building material, and
  - 2) Are sourced from product manufacturers with independent third party verification of their supply chain that at a minimum verifies:
    - a) Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
    - b) Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
    - c) Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
    - d) Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
    - e) Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
    - f) Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain.

D. Sample Warranty

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Include the following:
  - 1. Manufacturer's methods for maintaining carpet, including cleaning and stain-removal products and procedures. Manufacturers recommended maintenance schedule.
- B. Warranty: Full warranty information from the manufacturer. Must include "Proof of Purchase" indicating original install dates.

1.7 RECLAIMING PROCESS

- A. Comply with requirements of Division 01 Section "Construction Waste Management and Disposal."

1.8 ATTIC STOCK SUPPLY

- A. Furnish extra materials from the same product run and dye lot that match products installed. Carpet shall be in its original packaging with protective covering for storage and identified with labels describing contents.
  - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. Attic stock shall be provided for each carpet type.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Fire-Test-Response Ratings: Where indicated, **[provide carpet identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency] [provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency]** acceptable to authorities having jurisdiction.
- C. Mockups: Architect or UH Project Manager may require a mockup for certain carpet applications. Verify with both Architect and UH Project Manager if mockups are required.
- D. Electrostatic Propensity: Less than **[3.5] [2] <Insert number>** kV according to AATCC 134.

1.10 WARRANTY

- A. Warranty for Modular Carpet: The warranty information listed below are minimums. Manufacturer agrees to repair or replace components of modular carpet installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: minimum 15 years from date of occupancy. Chairpads shall not be required to maintain warranty.
  - 2. Back Delamination – lifetime.
  - 3. Edge Ravel – lifetime.
  - 4. Static Protection –lifetime.
  - 5. Wear – surface wear shall not be greater than 10 percent by weight for the first 15 years.
- B. Warranty for Broadloom Carpet: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: minimum 10 years from date of occupancy. Chairpads shall not be required to maintain warranty.

2. Back Delamination – lifetime.
3. Edge Ravel – lifetime.
4. Static Protection –lifetime.
5. Wear – surface wear shall not be greater than 10 percent by weight for the first 15 years.

## PART 2 - PRODUCTS

### 2.1 MODULAR CARPET

- A. Minimum specifications for modular carpet:
1. Fiber: Type 6,6 Nylon fibers
  2. Dye Method: 100 percent Solution Dyed. Antron Legacy w/ Duracolor.
  3. Pile Weight: 17 oz.
  4. Pile Construction: Loop construction.
  5. Gauge: 1/10inch.
  6. Construction: Tufted or Woven
  7. Density: High Traffic Areas & Dormitories 6,500; All other areas 5,500
  8. Backing: High performance backing with moisture barrier
  9. Size: 18"x18" or 24"x24"
  10. Recycled Content: 25 percent.
  11. Applied Soil-Resistance Treatment: Integral to carpet manufacture.
  12. Critical Radiant Flux Classification: Not less than **[0.45 W/sq. cm]** **[0.22 W/sq. cm]** according to NFPA 253.

### 2.2 BROADLOOM CARPET

- A. Minimum specifications for broadloom carpet.
1. Fiber: Type 6,6 Nylon fibers w/ anti-stain protection.
  2. Dye Method: 100 percent Solution Dyed. Antron Legacy w/ Duracolor.
  3. Pile Weight: 24 oz
  4. Pile Construction: Loop Construction. Under certain circumstances Owner may consider a mixed loop and tip sheer; such construction requires approval by UH FPC.
  5. Gauge: 1/10 inch.
  6. Construction: Tufted or Woven
  7. Density: High Traffic Areas & Dormitories 6,500; All other areas 5,500
  8. Recycled Content: 25 percent
  9. Backing: Unitary performance backing. Backing shall be approved by UH FPC.
  10. Applied Soil-Resistance Treatment: Integral to carpet manufacture.
  11. Critical Radiant Flux Classification: Not less than **[0.45 W/sq. cm]** **[0.22 W/sq. cm]** according to NFPA 253.

## 2.3 WALK-OFF CARPET TILE

- A. [Nylon] [Polypropylene] [Olefin] [Polyester] carpet bonded to 1/8- to 1/4-inch- (3- to 6-mm-) thick, flexible vinyl backing to form mats 3/8 or 7/16 inch (9.5 or 11 mm) thick with non-raveling edges.
1. Tapered Flexible Molding: Tapered vinyl carpet edge moldings with flanges fused to back of mat at [ends of runners] [all four edges, with mitered corners].

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
  2. Subfloor finishes comply with requirements specified in Section 03 3000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
  3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. For wood subfloors, verify the following:
1. Underlayment over subfloor complies with requirements specified in Section 06 1053 "Miscellaneous Rough Carpentry."
  2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. For metal subfloors, verify the following:
1. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- E. For painted subfloors, verify the following:
1. Perform bond test recommended in writing by adhesive manufacturer.
- F. For raised access flooring systems, verify the following:
1. Access floor substrate is compatible with carpet tile and adhesive if any.
  2. Underlayment surface is flat, smooth, evenly planed, tightly jointed, and free of irregularities, gaps greater than [1/8 inch (3 mm)] <Insert dimension>, protrusions

more than **1/32 inch (0.8 mm)**, and substances that may interfere with adhesive bond or show through surface.

- G. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 FIELD CONDITIONS AND INSTALLATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by manufacturer.
- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.
- F. Comply with manufacturer's requirements for temperature, humidity, ventilation limitations and installation methods for the particular subfloor or substrate. If the manufacturer does not have a set standard, reference the Carpet and Rug Institute Carpet Installation Standard 2011, First Edition.
- G. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- H. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.
- I. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

- J. All installations shall meet the manufacturer's guidelines. This is extremely important when concerning the warranty of the product.
- K. Installation Method: A "NO-Glue Grid" method of installation is preferred if feasible and available on modular carpet only. Other adhesives shall be of low odor/solvent content. Verify the installation method and only use products recommended by the Manufacturer. Self-stick method type requires approval by UH FPC.
- L. Maintain dye lot consistency throughout the project.
- M. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by manufacturer.
- N. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- O. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- P. Stagger joints of modular carpet so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

### 3.3 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet according to manufacturer's guidelines.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION 09 6813

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### SECTION 09 9123 - INTERIOR PAINTING

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information.

Edit and finalize this Section, where prompted by Editor's notes, to suit Project specific requirements. Make selections for the Project at text identified in bold.

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
  - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

#### 1.2 SUMMARY

- A. Section includes surface preparation and application of paint systems on interior substrates.

#### 1.3 DEFINITIONS

- A. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate, or finish coats.

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1. "Substrate" means the surface to which paint is to be applied. In the case of previously painted existing surfaces, substrate means the surface to which the existing paint was applied.
- B. "Interior Surfaces" means all interior surfaces, including surfaces in unconditioned areas, that are not exposed to untreated outside air.
- C. Standard coating terms defined in ASTM D 16 apply to this Section.
  1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
  2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
  3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
  4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.
- D. MPI Gloss and Sheen Standards; As follows when tested in accordance with ASTM D 523.

[Retain gloss levels defined in subparagraphs below to suit Project.](#)

1. Gloss Level 1: A traditional matte finish – flat.
  - a. Gloss Measured at 60 degrees: Maximum 5 units.
  - b. Sheen Measured at 85 degrees: Maximum 10 units.
2. Gloss Level 2: A high side sheen flat – velvet.
  - a. Gloss Measured at 60 degrees: Maximum 10 units.
  - b. Sheen Measured at 85 degrees: 10 to 35 units.
3. Gloss Level 3: A traditional egg-shell finish.
  - a. Gloss Measured at 60 degrees: 10 to 25 units.
  - b. Sheen Measured at 85 degrees: 10 to 35 units.
4. Gloss Level 4: A satin finish.
  - a. Gloss Measured at 60 degrees: 20 to 35 units.
  - b. Sheen Measured at 85 degrees: Minimum 35 units.
5. Gloss Level 5: A traditional semi-gloss.
  - a. Gloss Measured at 60 degrees: 35 to 70 units.
6. Gloss Level 6: A traditional gloss.
  - a. Gloss Measured at 60 degrees: 70 to 85 units.
7. Gloss Level 7: A high gloss.
8. Gloss Measured at 60 degrees: More than 85 units.



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1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.

Retain paragraph and associated subparagraphs below if Project is to be LEED v4 certified.

- B. LEED Action Submittals (Projects authorized for LEED certification only):

1. Building Product Disclosure and Optimization:

a. Leadership Extraction Practices

- 1) Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
- 2) Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
  - a) Include statement indicating costs for each product having recycled content.

b. Sourcing of Raw Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.

- 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.
- 2) Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.

2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method V1.1-2010, using the applicable exposure scenario.

a. Paints, and Coatings: For wet applied on site products, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.

b. Adhesives and Sealants: For wet applied on site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005 and rule amendment date of January 7, 2005.

- 1) Product Data: For installation adhesives, indicating VOC content.

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- c. Alternative tests for VOC above include ASTM D2369-10; ISO 11890 part 1; ASTM D6886-03; or ISO 11890-2.
  - d. Methylene Chloride and perchloroethylene may not be added to paints, coating, adhesive or sealants.
  - e. Provide General Emissions Evaluation certificates for adhesives, sealants showing compliance with California Department of Public Health v1.1 emissions testing or equivalent.
3. Laboratory Test Reports: For installation adhesives indicating compliance with requirements for low-emitting materials.
- C. Samples for Initial Selection: For each type of topcoat product.
- D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
- 1. Submit Samples on rigid backing, 8 inches square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
- E. Product List: For each product indicated, include the following:
- 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
  - 3. VOC content.
  - 4. Include above information in project closeout Operations and Maintenance manuals.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Material Certificates: For each type of paint, from manufacturer.

Retain paragraph and associated subparagraphs below if Project is to be LEED v4 certified.

- B. Informational LEED Submittals:
- 1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
    - a. Raw Material Sources and Extraction Reporting: Submit Raw materials supplier corporate Sustainability Reports (CSRs); documenting responsible extraction; including extraction locations, long term ecologically responsible land use, commitment to reducing environmental harms from extraction and manufacturing processes, and a commitment to meeting applicable standards or programs that address responsible sourcing criteria
      - 1) Submit manufacturers' self-declared reports

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- 2) Submit third party verified corporate sustainability reports (CSR) using one of the following frameworks"
    - a) Global Reporting Initiative (GRI) Sustainability Report
    - b) Organization for Economic Co-operation and Development (OECD)
    - c) Guidelines for Multinational Enterprises
    - d) UN Global Compact
    - e) ISO 26000
    - f) USGBC approved program.
2. Building Product Disclosure and Optimization - Material Ingredients
- a. Material Ingredient Optimization: Submit manufacturer's Environmental Product Declaration (EPD) or at least one of the following:
    - 1) GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
    - 2) Cradle to Cradle: Manufacturer's published literature for the product bearing the Cradle to Cradle logo.
    - 3) International Alternative Compliance Path - REACH Optimization
    - 4) Declare: Manufacturer's completed Product Declaration Form
    - 5) Other programs approved by USGBC
  - b. Product Manufacturer Supply Chain Optimization: Submit documentation from manufacturers for products that go beyond material ingredient optimization as follows:
    - 1) Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99 percent (by weight) of the ingredients used to make the building product or building material, and
    - 2) Are sourced from product manufacturers with independent third-party verification of their supply chain that at a minimum verifies:
      - a) Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
      - b) Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
      - c) Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
      - d) Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
      - e) Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain

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- f) Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain.

**1.6 QUALITY ASSURANCE**

- A. **Applicator Qualifications:** A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. **Source Limitations:** Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- C. **Benchmark Samples (Mockups):** Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
  - 1. Architect will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.
    - a. **Wall Surfaces:** Provide samples on at least 100 sq. ft.
    - b. **Small Areas and Items:** Architect will designate items or areas required.
  - 2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
    - a. After finishes are accepted, Architect will use the room or surface to evaluate coating systems of a similar nature.
  - 3. Final approval of colors will be from benchmark samples.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
  - 1. Product name.
  - 2. Manufacturer's stock number and date of manufacture.
  - 3. Contents by volume, for pigment and vehicle constituents.
  - 4. Color name and number.
  - 5. VOC content.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

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1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Sherwin-Williams Company.
  - 2. Substitutions: See Section 01 2500 "Substitution Procedures."
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Ready mixed, unless intended to be a field-catalyzed coating.
- C. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 3. Supply each coating material in quantity required to complete entire project's work from a single production run.
  - 4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
  - 5. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

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- D. VOC Content: Products shall comply with the most stringent VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 1. Flat Paints and Coatings: 50 g/L.
  - 2. Non-flat Paints and Coatings: 150 g/L.
  - 3. Dry-Fog Coatings: 400 g/L.
  - 4. Primers, Sealers, and Undercoaters: 200 g/L.
  - 5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
  - 6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
  - 7. Pretreatment Wash Primers: 420 g/L.
  - 8. Floor Coatings: 100 g/L.
  - 9. Shellacs, Clear: 730 g/L.
  - 10. Shellacs, Pigmented: 550 g/L.
  
- E. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  
- F. Colors: As selected by Architect from Owner's published Interior Paint Palette. Other, non-standard colors are not permitted..

**2.3 PRIMERS/SEALERS**

- A. General: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

**2.4 WATER-BASED PAINTS**

- A. As designated on Drawings. Latex, Interior, Flat, (Gloss Level 1): MPI #53.
- B. Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss (Gloss Level 5): MPI #147.

**2.5 FLOOR COATINGS**

- A. Stain, Interior, for Concrete Floors: MPI #58.
- B. Sealer, Water Based, for Concrete Floors: MPI #99.

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2.6 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  2. Testing agency will perform tests for compliance with product requirements.
  3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
  2. Masonry (Clay and CMU): 12 percent.
  3. Wood: 15 percent.
  4. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

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- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
  - 1. SSPC-SP 2, "Hand Tool Cleaning."
  - 2. SSPC-SP 3, "Power Tool Cleaning."
  - 3. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view and remove dust.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.



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**3.3 APPLICATION**

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
  
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat but provide sufficient difference in shade of undercoats to distinguish each separate coat.
  
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
  
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
  
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in equipment rooms:
    - a. Equipment, including panelboards and switch gear.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.
    - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  
  - 2. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.

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- e. Metal conduit.
  - f. Plastic conduit.
  - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  - h. Other items as directed by Architect.
3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

**3.4 FIELD QUALITY CONTROL**

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
- 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

**3.5 CLEANING AND PROTECTION**

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

**3.6 INTERIOR PAINTING SCHEDULE**

- A. Concrete Substrates, Non-traffic Surfaces:
- 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.

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2. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.
  3. High-Performance Architectural Latex System:
    - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
    - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
    - c. Topcoat: Latex, interior, high performance architectural, semi-gloss (Gloss Level 5), MPI #141.
- B. Concrete Substrates, Traffic Surfaces:
1. Concrete Stain System:
    - a. First Coat: Stain, interior, for concrete floors, MPI #58.
    - b. Topcoat: Stain, interior, for concrete floors, MPI #58.
  2. Water-Based Clear Sealer System:
    - a. First Coat: Sealer, water based, for concrete floors, MPI #99.
    - b. Topcoat: Sealer, water based, for concrete floors, MPI #99.
- C. CMU Substrates:
1. Institutional Low-Odor/VOC Latex System:
    - a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.
- D. Steel Substrates:
1. Latex over Alkyd Primer System:
    - a. Prime Coat: Shop primer specified in Division 05 Section "Structural Steel Framing" where substrate is specified.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.
  2. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer, rust-inhibitive, water based MPI #107.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.

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3. High-Performance Architectural Latex System:
  - a. Prime Coat: Shop primer specified in Division 05 Section "Structural Steel Framing" where substrate is specified.
  - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
  - c. Topcoat: Latex, interior, high performance architectural, semi-gloss (Gloss Level 5), MPI #141.
  
- E. Galvanized-Metal Substrates:
  1. Latex over Waterborne Primer System:
    - a. Prime Coat: Primer, galvanized, water based, MPI #134.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.
  2. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer, galvanized, water based, MPI #134.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.
  3. High-Performance Architectural Latex System:
    - a. Prime Coat: Primer, galvanized, water based, MPI #134.
    - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
    - c. Topcoat: Latex, interior, high performance architectural, semi-gloss (Gloss Level 5), MPI #141.
  
- F. Wood Substrates: Including wood trim doors and wood-based panel products.
  1. Latex System:
    - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.
  2. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.
  3. High-Performance Architectural Latex System:
    - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
    - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.

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- c. Topcoat: Latex, interior, high performance architectural, semi-gloss (Gloss Level 5), MPI #141.

G. Gypsum Board or Plaster Substrates:

1. Latex System:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.

2. Institutional Low-Odor/VOC Latex System:

- a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
- b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
- c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.

3. High-Performance Architectural Latex System:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.
- b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural, semi-gloss (Gloss Level 5), MPI #141.

H. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.

1. Latex System:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54.

2. Institutional Low-Odor/VOC Latex System:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.
- b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
- c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.

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