

## **SECTION 06 16 00 - SHEATHING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes, but is not limited to the following:
  - 1. Wall sheathing.
  - 2. Parapet sheathing
  - 3. Sheathing joint and penetration treatment.
  - 4. Subflooring and underlayment.
- C. Related Work:
  - 1. Division 06, Section 06 10 53 "Miscellaneous Rough Carpentry".
  - 2. Division 07, Section 07 62 00 "Sheet Metal Flashing and Trim" for waterproofing applied over roof and canopy sheathing.
  - 3. Division 07, Section 07 27 26 "Fluid Applied Air and Water Barriers" for air barriers applied over wall sheathing.
  - 4. Division 08, Section 08 40 00 "Exterior Enclosure System Requirements" for performance requirements of sheathing supporting exterior claddings.
  - 5. Division 09, Section 09 21 00 "Gypsum Board Assemblies" for interior wall gypsum board and tile backing panels.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
  - 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.
  - 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. Sustainable Design Submittals:
  - 1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
    - a. Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.

- b. Bio-based Materials: For bio-based products and materials other than wood, submit documentation of product data and testing results in compliance with LEED requirements.
  - c. Wood Products: Submit documentation of Forest Stewardship Council or USGBC equivalent certification.
  - d. Materials Reuse: For products that are salvaged, refurbished, or reused, include a statement indicating costs for each product.
  - e. Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
    - 1) Include statement indicating costs for each product having recycled content.
  - f. Regional 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. 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 or v1.2 2017, 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 1113-2011.
  - 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.
  - 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. Composite Wood: Submit documentation showing that wood used in the project has low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

C. Shop Drawings:

- 1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
- 2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: From glass-mat gypsum sheathing manufacturer, certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.
- B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preserved-treated plywood.
2. Fire-retardant-treated plywood.

C. Sustainable Design Submittals:

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 - Material Ingredients
  - a. Material Ingredient Reporting: Submit documentation confirming chemical inventory of products to at least 0.1 % (1000ppm) with at least one of the following:
    - 1) Submit published manufacturer inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
    - 2) Submit documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
    - 3) Submit Declare product label indicating that all ingredients have been disclosed down to 1000 ppm or designated as Red List Free or Declared
    - 4) Living Product Challenge
    - 5) Product Lens Certification
    - 6) USGBC approved program.
  - b. Material Ingredient Optimization: Submit documentation confirming chemical inventory of products to at least 0.01 % (100ppm) and/or that has a compliant material ingredient optimization report with at least one of the following:
    - 1) Submit GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
    - 2) Submit third-party verified documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
    - 3) Submit third-party verified Cradle to Cradle v3 Material Health certificate at the Bronze Level or better
    - 4) Submit third-party verified Declare product label indicating that all ingredients have been disclosed down to 100 ppm
    - 5) Submit third-party verified documentation that product is Living Product Challenge certified with a Red List Free or LBC Red List Free Declare label.
    - 6) Submit documentation that product has a manufacturer prepared action plan with material inventory to at least 1000 ppm.

#### 1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

B. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly, 150 sq. ft. (14 sq. m), incorporating backup wall construction, curtain wall, door frame and sill, ties and other penetrations, and flashing to demonstrate crack and joint treatment and sealing of gaps, terminations.
  - a. Coordinate construction of mockups to permit inspection and testing of sheathing before external insulation and cladding are installed.
  - b. If Architect determines mockups do not comply with requirements, reconstruct mockups until mockups are approved.
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.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistance Ratings: For assemblies with fire resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance according to ASTM E119; testing by a qualified testing agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
  1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

### **2.2 PRESERVATIVE-TREATED PLYWOOD**

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
  1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, and vapor barriers.

## 2.3 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat all plywood unless otherwise indicated.

## 2.4 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C1177/C1177M
  - 1. Products:
    - a. Subject to compliance with requirements, provide one of the following:
      - 1) CertainTeed Corporation; GlasRoc.
      - 2) Continental Building Products, LLC; Weather Defense.
      - 3) Georgia-Pacific Building Products; Dens-Glass Gold.
      - 4) National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
      - 5) United States Gypsum Company; Securock type X.
  - 2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick.
  - 3. Size: 48 by 120 inches (1219 by 3048 mm) for vertical installation.
- B. Low-Emitting Materials:
  - 1. Architectural paints and coatings wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
  - 2. All paints and coatings wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01, Section 01 81 13 "Sustainable Design Requirements - LEED v4 BD+C."

3. Adhesives and Sealants wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
4. All adhesives and sealants wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01, Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."
5. Provide non-structural composite wood products that contain either No Added Formaldehyde (NAF) resins or Ultra Low Emitting Formaldehyde (ULEF) resins per CARB ATCM criteria noted in Division 01, Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."
6. Provide structural composite wood products tested per EN 717-1:2014 as compliant with emissions class E1. Structural composite wood, with no added urea-formaldehyde resins or surface treatments and certified per the following: PS 1-09 or PS 2-10 for plywood, PS 2-10 for OSB, ASTM D 5446-13 for structural composite lumber.

## **2.5 PARAPET SHEATHING**

- A. Plywood Sheathing: [Either DOC PS 1 or DOC PS 2], [Exterior] [Exposure 1] sheathing.
1. Span Rating: Not less than [16/0] [20/0] [24/0] [32/16].
  2. Nominal Thickness: Not less than 3/4 inch (19 mm).

## **2.6 FASTENERS**

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. For parapet sheathing, provide fasteners of Type 304 stainless steel where pressure treated plywood is used otherwise hot-dip zinc coating complying with ASTM A153/A153M may be used.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
1. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C1002.
  2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C954.
- D. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

## **2.7 SUBFLOORING AND UNDERLAYMENT**

- A. Plywood Subflooring: [DOC PS 1] [Either DOC PS 1 or DOC PS 2], single-floor panels or sheathing.
1. Span Rating: Not less than [16] [20] [24] [32] [48] [or] [32/16] [40/20] [48/24].
  2. Nominal Thickness: Not less than [23/32 inch (18.3 mm)] [7/8 inch (22.2 mm)] [1 inch (25 mm)].

- B. Underlayment: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch (6.4 mm).

- 1. Plywood Underlayment for Carpet Flooring: Exterior, C-C Plugged] [Exposure 1 Underlayment] with fully sanded face.

## **2.8 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS**

- A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
  - 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
  - 2. ICC-ES evaluation report for fastener.
- D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### **3.2 WOOD PANEL INSTALLATION**

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
  - 1. Subflooring:

- a. Screw to cold-formed metal framing.
  - b. Space panels 1/8 inch (3 mm) apart at edges and ends.
2. Wall Sheathing:
  - a. Screw to cold-formed metal framing.
  - b. Space panels 1/8 inch (3 mm) apart at edges and ends.
3. Underlayment:
  - a. Nail or staple to subflooring.
  - b. Space panels 1/32 inch (0.8 mm) apart at edges and ends.
  - c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

### **3.3 GYPSUM SHEATHING INSTALLATION**

- A. Comply with GA-253 and with manufacturer's written instructions.
  1. Fasten gypsum sheathing to cold-formed metal framing with screws.
  2. Install panels with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
  3. Install panels with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
  1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
- D. Seal sheathing joints according to sheathing manufacturer's written instructions.
  1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
  2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

### **3.4 PROTECTION**

- A. Gypsum Sheathing: Protect sheathing by covering exposed exterior surface of sheathing with weather-resistant sheathing paper securely fastened to framing. Apply covering immediately after sheathing is installed.

**END OF SECTION**