

SECTION 06 12 19

STRUCTURAL INSULATED PANELS

This Section includes notes to assist the user in editing the Section to suit project requirements. These notes are included as hidden text and can be revealed or hidden by one of the following methods:

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PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Structural insulated panels (SIP) for **[wall]** **[floor]** **[and]** **[roof/ceiling]** applications.

1.2 REFERENCES

- A. Reference Standards:
1. ASTM International (ASTM):
 - a. C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
 - b. D2559 – Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions.
 - c. E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 2. National Institute of Standards and Technology (NIST):
 - a. Voluntary Product Standard PS 1-09 – Structural Plywood. [5/10. Supersedes PS 1-95](#)
 - b. Voluntary Product Standard PS 2-10 – Performance Standards for Wood-Based Structural Use Panels. [6/11. Supersedes PS 2-04](#)
 - c. Voluntary Product Standard PS 20-10 – American Softwood Lumber Standard. [6/10. Supersedes PS 20-05](#)
 3. NTA, Inc.:
 - a. NTA IM14 Structural Insulated Panel Evaluation.
 - b. NTA IM36 Quality System Requirements.
 4. Western Wood Products Association (WWPA): Western Lumber Grading Rules (G-5).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meetings: Conduct meeting at Project site to comply with requirements in Division 01 Section – Project Management and Coordination.
1. Meet with Owner, Architect, SIP Installer, and installers whose Work interfaces with or affects SIPs.
 2. Review Project requirements, foundation, structural and system/substrate conditions, SIP manufacturer's installation instructions, and SIP manufacturer's warranty requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-engineered product.
1. Include information for panel construction, performance data, and fire ratings.
 2. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
 3. Instructions: SIP manufacturer's instructions including design calculations.

- B. Shop Drawings: Include panel layout, elevations, sections, details, size of openings, and attachments to other Work.
 - 1. Submit Shop Drawings that have been engineered and certified by professional engineer licensed in the State in which Project is located. Include seal and signature of professional engineer on Shop Drawings.
- C. Design Data: Engineering calculations for loading and stresses, bearing seal and signature of professional engineer licensed in the State in which Project is located.
- D. Test and Evaluation Reports:
 - 1. SIP Code Compliance: NTA, Inc. listing report, or comparable independent code report acceptable to local building authority, for SIPs indicating evidence of compliance with building code requirements as an alternate method of construction. Submit current compliance report number indicating conformance to IBC. Include compliance with ICC ES AC04 (Sandwich Panels).
 - 2. EPS Insulation Code Compliance: NTA, Inc. listing report, or comparable independent code report acceptable to local building authority, for EPS insulation indicating evidence of compliance with building code. Submit current compliance report number indicating conformance to IBC and IRC. Include compliance with ICC ES AC12 (Foam Plastic) and ICC ES AC239 (Termite Resistance).
 - 3. Diaphragm Assembly Test: Indicating compliance with ASTM E455 as tested by NTA, Inc.

1.5 INFORMATIONAL SUBMITTALS

- A. Quality Control Submittals:
 - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics.
 - 2. Certification: Manufacturer's certification that Products furnished meet specified design and performance criteria.
- B. Sustainable Design Submittals:
 - 1. Regional products.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with minimum 5 years' documented experience in fabrication, and a member of the Structural Insulated Panel Association (SIPA).
- B. Erector Qualifications: An experienced erector, with minimum 3 years' documented experience, who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- C. Source Limitations: Obtain structural insulated panels from single source from single manufacturer. Obtain accessories provided or recommended by SIP manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery structural insulated panels to Project site with documentation indicating the following:
 - 1. Manufacturer.
 - 2. Product standard and type.
 - 3. Flame spread and smoke developed ratings.
 - 4. Identification of quality assurance agency.
- B. Handle and store structural insulated panels per manufacturer's recommendations.
 - 1. Store panels flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect panels from moisture and sunlight by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
 - 4. Use support panels with straps or I-bolts when lifting panels with crane.

1.8 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace material that fails in materials within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from the following manufacturer:
Energy Panel Structures, Inc.
102 East Industrial Park
Graettinger, IA 51342
Toll Free: 800.967.2130
Fax: 712.859.3275
Email: sales@epsbuildings.com
Website: www.epsbuildings.com

2.2 PERFORMANCE CRITERIA

- A. Design Requirements: Panel system design performed by or under direct supervision of professional Structural Engineer with experience in work of this Section.
- B. Performance Requirements; Design panel system to withstand:
 - 1. Live and Dead Loads, Maximum Deflection under Loading: Comply with applicable building codes.
 - 2. Movement caused by an ambient temperature range of 120 degrees F (49 degrees C).and a surface temperature range of 160 degrees F (71 degrees C).

2.3 MATERIALS

- A. Molded-Polystyrene Board Insulation: ASTM C578.
 - 1. Surface Burning Characteristics per ASTM E84:
 - a. Flame Spread: 75.
 - b. Smoke Developed: <450.
 - 2. Type I, 10 psi (69 kPa).
- B. Lumber Framing:
 - 1. Species: Spruce-Pine-fir or equivalent.
 - 2. Grade: WWPA No. 2.
- C. Facings: Provide one of the following types of SIP facings, bearing inspecting agency's trademark or certification. Products shall contain no urea formaldehyde.

EDIT NOTE: OSB IS MANUFACTURER'S STANDARD SIP FACING. PLYWOOD IS AVAILABLE. WORK WITH MANUFACTURER'S REPRESENTATIVE IF PLYWOOD IS REQUIRED FOR PROJECT.

- 1. Oriented-Strand-Board (OSB): Exposure 1 sheathing, conforming to 2009 IRC and Voluntary Product Standard PS 2-10.
 - a. Span Rating: Not less than 24/16.
 - b. Nominal Thickness: Not less than 7/16 inch (11 mm).
- 2. Plywood: Exterior, Exposure 1 sheathing.
 - a. Span Rating: Not less than 24/0.
 - b. Nominal Thickness: Not less than 1/2 inch (13 mm).

EDIT NOTE: DELETE PANEL FINISHES BELOW NOT REQUIRED FOR PROJECT. IF MORE THAN ONE FINISH IS USED, IDENTIFY EACH ON DRAWINGS.

- D. Panel Finish: Provide SIPs with the following exposed finish material:
 - 1. Aluminum-siliconized polyester coating system composed of polyester resin modified by copolymerization with functional silicone resin.
 - a. Exterior Finish: Manufacturer's standard embossed stucco texture.
 - b. Thickness: 0.011 inch.(0.28 mm).
 - c. Color: White.
 - 2. Glass-fiber reinforced plastic (FRP) panels with gelcoat-finish, complying with ASTM D5319.
 - a. Surface-Burning Characteristics: As follows when tested by a qualified testing agency per ASTM E84.
 - 1) Flame-Spread Index: [25 (Class A)] [200 (Class C)] or less.
 - 2) Smoke-Developed Index: 450 or less.
 - b. Thickness: 0.030 inch (0.76 mm) to 0.090 inch (2.3 mm).
 - c. Surface: Embossed stucco texture.
 - d. Color: White.

2.4 ACCESSORIES

- A. Thermal Barrier: Provide material acceptable to applicable building code to provide 15 minute thermal barrier.
- B. Laminating Adhesive: SIP manufacturer's standard laminating adhesive.
- C. Panel Sealant: Type recommended by SIP manufacturer.
 - 1. VOC Content of Sealants: Provide sealants the following limits for VOC content when calculated per 40 CFR 59, Part 59, Subpart D (EPA Method 24):
 - a. Architectural Sealants: 250 g/L.
- D. SIP Tape: Type recommended by SIP manufacturer.
- E. Fasteners: Galvanized or corrosion resistant coated; types and sizes as recommended by SIP manufacturer.

2.5 FABRICATION

- A. General: Fabricate panels with specified facings of thickness to meet design criteria, pressure laminated to insulation core with laminating adhesive.
- B. Exterior Finish: Apply specified finish material to exterior [and interior] of panels.
- C. Panel Thickness: Nominal [4-1/2 inches (114 mm)] [6-1/2 inches (165 mm)] [8-1/2 inches (216 mm)].
- D. Thermal-Resistance Value (R-Value): ASTM C1363, minimum of R-values as follows:

EDIT NOTE: MANUFACTURER'S STANDARD R-VALUE IS R-18. DELETE R-VALUES NOT REQUIRED FOR PROJECT.

- 1. Wall Panels: R-18 [R-26] [R-33] [R-40].
- 2. Roof Panels: R-18 [R-26] [R-33] [R-40].

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PANEL INSTALLATION

- A. Install panel system per SIP manufacturer's instructions and approved Shop Drawings.
- B. Install continuous bottom plate.
 - 1. Attach bottom plates at exterior walls to concrete foundation with anchor bolts spaced maximum 4 feet (1.22 m) on center and within 6 inches (152 mm) of ends of pieces, with minimum of 2 anchors per piece, or with foundation anchor straps.
 - 2. Attach interior bottom plates to concrete foundation with approved anchors.
- C. Install continuous top plates. Overlap plates at corners, intersections, and splines.
- D. Drill 1-1/2 inch (38 mm) diameter access holes in splines to align with electrical chases.
- E. Apply sealant in continuous beads to wood-to-wood, wood-to-insulation, and insulation-to-insulation joints per manufacturer's recommendations.
- F. Fasten panels to framing through both facing surfaces unless otherwise indicated.
- G. Provide temporary bracing during erection and until final connections are complete.
- H. Do not install panels directly on concrete; use double plate sill detail or place sill sealer under panels.
- I. Do not place plumbing in panels without approval of panel manufacturer.
- J. Do not cut panel skins for electrical chases. Cut for electrical boxes as needed, but do not cut through to panel edges.
- K. Install SIP tape or sealant at interior joints between roof SIPs and at intersections of roof to wall SIPs.
- L. Install thermal barrier over interior surfaces of SIPs per applicable building code and SIP manufacturer's recommendations.

3.3 ADJUSTING

- A. Remove SIPs which have been damaged or have become wet and replace with new SIPs prior to proceeding with SIP installation or other Work associated with SIP installation.

3.4 PROTECTION

- A. Cover wall panels with moisture barrier or final wall cladding as soon as practical after erection.
- B. Cover roof panels with water-resistant paper or roofing underlayment immediately after erection.

END OF SECTION