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PREMIER BUILDING SYSTEMS
FASTER. STRAIGHTER. GREENER.™

STRUCTURAL INSULATED PANELS
Guide Specification

Structural insulated panels (SIPs) are a high-performance building system for residential and light commercial Type V construction. SIPs consist of an insulating foam core sandwiched between two structural facings, typically oriented strand board (OSB). SIPs are manufactured under factory-controlled conditions and can be fabricated to fit nearly any building design. The result is a building system that is extremely strong, energy efficient, and cost effective. Building with SIPs will save you time, money, and labor.

A SIP home or commercial building allows for better control over indoor air quality because of its extremely low air leakage through the building envelope.

The components used to make SIPs (foam, OSB, and adhesive) meet some of the most stringent low VOC standards for indoor air quality.

SIP homes have qualified under the American Lung Association's Health House® indoor air quality standard and the Institute for Business and Home Safety Fortified Program for resilient storm-resistant construction.

Premier Building Systems has been in existence for nearly 40 years and has received more awards than any other manufacturer in the industry. Premier is recognized as the leader when it comes to advancing energy-efficient construction with structural insulated panels.

Access Premier's extensive technical library at www.premiersips.com.

Premier's Regional Managers would be pleased to assist with your specification or any other needs. Please contact your regional representative. Find your closest representative contact at www.premiersips.com/contact-a-representative/ or by calling 800-275-7086.

SECTION 06 12 00 - STRUCTURAL INSULATED PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Structural Insulated Panels (SIPs) and accessories.

B. Related Requirements:

1. Section 06 10 00 Rough Carpentry for requirements for miscellaneous framing, blocking, and nailers associated with installation of SIPs.
2. Division 07 water resistive barrier section for application on SIP walls.
3. Division 07 roofing section for underlayment application over SIP roofs.
4. Division 09 flooring section for separation layer application over SIP floors.
5. Division 23 Heating, Ventilation, and Air Conditioning (HVAC)

1.2 SYSTEM DESCRIPTION

A. Structural Insulated Panels (SIPs) consist of oriented strand board (OSB) laminated with a structural adhesive to an expanded polystyrene insulation core.

B. SIP manufacturer-supplied accessories.

Specifier: Retain Paragraph C if treated OSB is desired to provide termite and fungal decay resistance (intergral zinc borate Treatment) or termite, fungal decay, and surface mold (FrameGuard Treatment) resistance.

C. Treatment for SIP OSB consisting of [integral Zinc Borate Treatment][FrameGuard Treatment].

1.3 REFERENCES

A. ANSI/APA PRS 610.1 - Standard for Performance Rated Structural Insulated Panels in Wall Applications.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

C. ASTM D7446 - Standard Specification for Structural Insulated Panel (SIP) Adhesives for Laminating Oriented Strand Board (OSB) to Rigid Cellular Polystyrene Thermal Insulation Core Materials.

D. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.

E. ICC-ES AC05 - Acceptance Criteria for Sandwich Panel Adhesives.

F. ICC-ES AC239 – Acceptance Criteria for Termite-Resistant Foam-Plastics

G. California Department of Public Health (CDPH) Standard Method v1.2: Private Office and School Classroom

H. California Department of Public Health (CDPH) Standard Method v1.2: Private Office and School Classroom

1.4 PREINSTALLATION MEETINGS

A. Pre-Installation Conference: Conduct meeting to verify Project requirements, foundation/structural system/substrate conditions, SIP manufacturer's installation instructions, SIP manufacturer's warranty requirements, and requirements of authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Product Code Report: Provide copy of manufacturer's ICC-ES Report
2. Quality Assurance Program: Provide evidence of manufacturer's third-party quality assurance program.
3. Manufacturer's instructions: Provide manufacturer's Design Manual and Load Design Charts.
4. SIPA Membership: Provide certificate indicating SIPs manufacturer is a Structural Insulated Panel Association (SIPA) manufacturing member in good standing.
5. Experience: Provide evidence of manufacturer's minimum of 5 years' experience manufacturing SIPs for projects of similar scope and size.

B. Installer: Installer shall have at least one of the following qualifications:

1. Field Supervisor having completed SIPA Registered Builder SIP Builder Training Program https://www.sips.org/training/sipa-registered-builder-program.
2. Field Supervisor having completed Carpenters International Training Fund (CITF) Program on Structural Insulated Panels https://www.carpenters.org/wp-content/uploads/2019/04/55505_CITF_TSC-SP-01-19_Special_Catalog_OPT.pdf
3. Field Supervisor having completed training provided by the SIP manufacturer.
4. Field Supervisor shall have a minimum of three verifiable SIP installations in successful service.

C. Professional Engineer: Experienced professional engineer licensed in the Project jurisdiction.

D. SIP Manufacturer's Installation Instructions: Instructions shall be available onsite.

1.6 ACTION SUBMITTALS

A. Product Data: For SIPs and accessories.
1. ICC-ES Report.
2. Design Manual.
3. Load Design Charts.
4. R-values.
5. SIP Sealant Product Data (reference: 1.3 H, 1.7 G, 1.8 C)
6. SIP Screw Product Data.
7. SIP Tape Product Data.

Specifier: Retain Item 8 if Treated OSB if applicable.

8. Treated OSB Product Data.

B. Shop Drawings: Show fabrication layout, supports required by this Section, and installation details for SIPs.

1. Indicate locations of structural supports not specified in this Section.

2. Indicate location and type of field-installed lumber.
3. Indicate type, size, and spacing requirements for fasteners.

Specifier: Retain "Design Loads" Paragraph if structural engineer of record has not made specific selections, and if Project requirements do not include delegated design by professional engineer.

4. Design Loads: Indicate design loads corresponding to Project requirements.

Specifier: Retain "Delegated Design" Paragraph in lieu of "Design Loads" Paragraph if Project requirements include delegated design by professional engineer.

C. Delegated Design: For SIPs indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

Retain option in "Qualification Data" Paragraph if Project requires delegated design.

A. Qualification Data: For Manufacturer, Installer [, and Professional Engineer].

B. Product Code Report: ICC-ES Report in conformance with AC04.

1. Label each SIP with identification of third-party inspection agency and evaluation report number.

C. Product Code Report: Evaluation Report in conformance AC239 for termite resistant expanded polystyrene insulation core

D. Shop drawings: Shop drawings for SIPs showing layout and elevations.

E. Engineering: Provide structural calculations by a registered architect or professional engineer [in the state of] to verify SIPs meet project requirements.

F. Clean Air Certificatification information for a complete SIP component assembly and the requirements for complying to the CDPH Standard Method v1.2: Private Office and School Classropm.

G. Clean Air Certification information for Sealants and the requirements for complying to CDPH Method v1.2: Private Office and School Classroom.

1.8 CLOSEOUT SUBMITTALS

A. Warranty: Executed copy of manufacturer warranty meeting requirements of Warranty Article.

B. Date valid Clean Air Certificate having the: SIP manufactures name, certificate number, manufacturing location, product description for the complete SIP component assembly, showing compliance to the CDPH Standard Method v1.2: Private Office and School Classrom.

C. Date valid Clean Air Certificate having the: SIP Sealant suppliers name, certificate number, supplier’s location, product description for the SIP Sealant, showing compliance to the CDPH Standard Method v1.2: Private Office and School Classroom.

1.9 DELIVERY, STORAGE & HANDLING

A. Handling: Unload and move SIPs using forklift or other means that fully support SIPs. Do not handle SIPs by top facing only.

B. Support: SIPs and SIP Accessories to be stored a minimum of 3 inches above ground/surface. Support SIPs flat on minimum of 3 in. wide stickers with length equal to the width of the SIPs with stickers placed no further than four feet on center, or equivalent.

C. Protection: Protect SIPs and SIP Accessories from exposure to the elements when stored onsite. Cover stored SIPs and SIP Accessories with secured protective covering.

1.10 WARRANTY

A. SIP Manufacturer Warranty: Warranty against material failure of SIPs installed according to manufacturer's instructions by qualified installer under normal use.

1. Warranty Period: 20 years from date of Substantial Completion.

1.11 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted without fourteen (14) day prior approval.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

Specifier: Retain "Delegated Design" Paragraph if applicable.

A. Delegated Design: Engage a qualified professional engineer to design structural components.

B. Structural Performance: SIPs shall withstand the effects of design loads shown on approved SIP Manufacturer’s shop drawings without exceeding allowable design working stresses.

Specifier: Indicate load requirements here. Revise "Design Loads" Subparagraph below and include applicable live, dead, snow, collateral, seismic, wind, and uplift loads, and load combinations.

1. Design Loads: As indicated on Structural Drawings.
2. Design Loads:

a. Design Wind Speed:
b. Live Loads (Roof):
c. Live Loads (Floor):

Specifier: Indicate Maximum Deflection under Design Loads.

3. Maximum Deflection under Design Loads:

a. Roof SIPs: Vertical deflection of [**L/180**] [**L/240**] [**L/360**] of span.
b. Wall SIPs: Vertical deflection of [**L/180**] [**L/240**] [**L/360**] of span
c. Floor SIPs: Vertical deflection of [**L/360**] [**L/480**] [**L/600**] of span.

Specifier: Retain “Fire Resistant Assemblies” Paragraph if applicable.

C. Fire Resistant Assemblies:

1. 1-hour Fire Resistant Wall Assembly
2. 1-hour Fire Resistant Roof Assembly

2.2 MANUFACTURERS

A. Basis of Design Manufacturer: Provides SIPs products by:

1. Premier Building Systems, LLC 18504 Canyon Road East, Puyallup, WA 98375. www.premiersips.com info@premiersips.com (800) 275-7086

B. Manufacturers: Subject to requirements of the Contract Documents, provide SIPs by one of the following:

1. Premier Building Systems, 15 Arden Drive, Belgrade, MT 59714. www.premiersips.com info@premiersips.com

2. Extreme Panel Technologies, Inc, 475 E 4th St., Cottonwood, MN 56229. www.extremepanel.com info@extremepanel.com

C. Limitations: Obtain SIPs from a single SIP manufacturer. Obtain SIP accessories from SIP manufacturer or as recommended by SIP manufacturer.

2.3 STRUCTURAL INSULATED PANELS (SIPs)

A. SIPs shall consist of the following panel construction:

1. Termite Resistant Expanded polystyrene insulation core complying with ASTM C578 Type I and ICC-ES AC239.
2. Oriented strand board (OSB) facing in conformance with DOC PS 2 and complying with ANSI/APA PRS 610.1 Table 2.
3. Adhesive complying with the requirements of ASTM D7446 or ICC-ES AC05.

Specifier: Select the appropriate SIP type and thickness to meet R-value or U-value requirements and delete unnecessary sizes. Industry minimum values are provided below. 40 deg. F is provided below as an option for cold climate regions where 40 deg. F basis may be appropriate for design. Please note, a wall or roof assembly, to meet R-value code requirements, may also require exterior cladding and interior finish, not included in values below.

B. SIP Walls:

1. 4-1/2 in. thick SIP with:

a. EPS Core SIP: R-value of 15 and a U-value of 0.066 at 75 deg. F.
b. EPS Core SIP: R-value of 16 and a U-value of 0.061 at 40 deg. F.
c. GPS Core SIP: R-value of 18 and a U-value of 0.055 at 75 deg. F.
d. GPS Core SIP: R-value of 19 and a U-value of 0.052 at 40 deg. F.

2. 6-1/2 in. thick SIP with:

a. EPS Core SIP: R-value of 23 and a U-value of 0.044 at 75 deg. F.
b. EPS Core SIP: R-value of 25 and a U-value of 0.040 at 40 deg. F.
c. GPS Core SIP: R-value of 28 and a U-value of 0.036 at 75 deg. F.
d. GPS Core SIP: R-value of 29 and a U-value of 0.034 at 40 deg. F.

3. 8-1/4 in. thick SIP with:

a. EPS Core SIP: R-value of 30 and a U-value of 0.034 at 75 deg. F.
b. EPS Core SIP: R-value of 32 and a U-value of 0.031 at 40 deg. F.
c. GPS Core SIP: R-value of 36 and a U-value of 0.028 at 75 deg. F.
d. GPS Core SIP: R-value of 38 and a U-value of 0.026 at 40 deg. F.

C. SIP Roof:

1. 4-1/2 in. thick SIP with:

a. EPS Core SIP: R-value of 15 and a U-value of 0.066 at 75 deg. F.
b. EPS Core SIP: R-value of 16 and a U-value of 0.061 at 40 deg. F.
c. GPS Core SIP: R-value of 18 and a U-value of 0.055 at 75 deg. F.
d. GPS Core SIP: R-value of 19 and a U-value of 0.052 at 40 deg. F.

2. 6-1/2 in. thick SIP with:

a. EPS Core SIP: R-value of 23 and a U-value of 0.044 at 75 deg. F.
b. EPS Core SIP: R-value of 25 and a U-value of 0.040 at 40 deg. F.
c. GPS Core SIP: R-value of 28 and a U-value of 0.036 at 75 deg. F.
d. GPS Core SIP: R-value of 29 and a U-value of 0.034 at 40 deg. F.

3. 8-1/4 in. thick SIP with:

a. EPS Core SIP: R-value of 30 and a U-value of 0.034 at 75 deg. F.
b. EPS Core SIP: R-value of 32 and a U-value of 0.031 at 40 deg. F.
c. GPS Core SIP: R-value of 36 and a U-value of 0.028 at 75 deg. F.
d. GPS Core SIP: R-value of 38 and a U-value of 0.026 at 40 deg. F.

4. 10-1/4 in. thick SIP with:

a. EPS Core SIP: R-value of 37 and a U-value of 0.027 at 75 deg. F.
b. EPS Core SIP: R-value of 40 and a U-value of 0.025 at 40 deg. F.
c. GPS Core SIP: R-value of 45 and a U-value of 0.022 at 75 deg. F.
d. GPS Core SIP: R-value of 48 and a U-value of 0.021 at 40 deg. F.

5. 12-1/4 in. thick SIP with:

a. EPS Core SIP: R-value of 45 and a U-value of 0.022 at 75 deg. F.
b. EPS Core SIP: R-value of 49 and a U-value of 0.021 at 40 deg. F.
c. GPS Core SIP: R-value of 55 and a U-value of 0.018 at 75 deg. F.
d. GPS Core SIP: R-value of 58 and a U-value of 0.017 at 40 deg. F.

2.4 SIP ACCESSORIES

A. Splines: Block Splines and I-Beam Splines for joining SIPs in accordance with SIP manufacturer's shop drawings shall be supplied by SIP manufacturer.

B. Sealant: Sealant for sealing SIPs in accordance with SIP manufacturer's instructions shall be supplied by SIP manufacturer.

C. SIP Screws: SIP manufacturer-provided screws for attachment of SIPs in accordance with SIP manufacturer's instructions.

D. Nails: Nails for attachment of SIP connections in accordance with SIP manufacturer's instructions shall be supplied by Installer.

E. SIP Tape: Tape for sealing SIP joints in accordance with SIP manufacturer's instructions shall be supplied by SIPs manufacturer.

Retain one of two options in "Lumber" Paragraph below. Retain cross-references to Rough Carpentry Section if requirements for accessory lumber are specified in that Section or add lumber and preservative-treated lumber requirements to this Section. Lumber of SPF#2 or better is a typical requirement, but due to regional lumber supply or engineer-specified lumber, it is important to confirm with SIP manufacturer.

F. Lumber: Lumber required for installation of SIPs in accordance with SIP manufacturer's instructions shall be supplied by [SIP manufacturer] [Installer].

1. Pressure-Treated Wood Sill Plate: Refer to Section 061000 "Rough Carpentry."
2. Other Lumber: Refer to Section 061000 "Rough Carpentry."

G. Capillary Break Material: Material required for installation of SIPs in accordance with the SIP manufacturer's written instructions.

2.5 FABRICATION

A. Sizes: Fabricate SIPs in accordance with approved SIP manufacturer's shop drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification: Verify conditions of foundation/structural system/substrate and other conditions which affect installation of SIPs. Verify foundation is plumb and square. Verify bearing requirements and substrate tolerances meet SIP manufacturer's written requirements.

B. Report non-complying conditions in writing to the SIP manufacturer and the design professional. Proceed with installation once non-complying conditions are corrected.

Specifier: Section 3.2 is general installation for SIP walls, roofs, and floors.

3.2 INSTALLATION OF SIPS, GENERAL

A. Installation: Handle and install SIPs in accordance with approved SIP manufacturer's shop drawings.

B. Splines: Install splines for joining SIPs in accordance with approved SIP manufacturer's shop drawings.

C. Sealant: Apply joint sealant for sealing SIPs in accordance with SIP manufacturer's written instructions.

D. Nails: Install nails for attachment of SIP connections in accordance with SIP manufacturer's shop drawings and SIP manufacturer's written instructions.

E. SIP Screws: Install SIP screws for attachment of SIPs in accordance with SIP manufacturer's shop drawings and SIP manufacturer's written instructions.

F. SIP Tape: Apply Tape for sealing SIP joints in accordance with SIP manufacturer's instructions.

G. Lumber: Install accessory lumber in accordance with approved SIP manufacturer's shop drawings and SIP manufacturer's written instructions.

Specifier: Select the appropriate Article(s) for installation of walls, roofs, and floors.

3.3 INSTALLATION OF SIPs IN WALL CONSTRUCTION

Specifier: Retain paragraphs A and/or B depending on wall SIP substrate.

A. Installation of SIP Walls on Concrete or Masonry Foundations:

1. Capillary Break: Install capillary break material on concrete slabs prior to erection of wall SIPs.
2. Treated Sill Plate: Install preservative-treated wood sill plate on concrete and masonry substrates equal in width to SIP thickness in accordance with approved SIP manufacturer's shop drawings and SIP manufacturer's instructions.

B. Installation of SIP Walls on Wood Subfloors:

1. SIP Bottom Plate: Install lumber bottom plate on wood subfloors in accordance with approved SIP manufacturer's shop drawings and SIP manufacturer's instructions.

C. SIP Installation: Refer to Section 3.2 for instructions

Specifier: Retain "SIP Cap Plate" Paragraph if cap plate is required.

D. SIP Cap Plate: Install cap plate on top of wall SIPs in accordance with approved SIP manufacturer's shop drawings and SIP manufacturer's instructions.

E. Weather-Resistant Barrier: Apply weather-resistant barrier immediately after SIPs installation is completed; refer to Division 07 weather-resistant barrier section. SIPs exposed to rain, frost or snow must be allowed to dry prior to application of weather-resistant barrier.

3.4 INSTALLATION OF SIPs IN ROOF CONSTRUCTION

A. Support: Confirm support structure provides adequate bearing for SIPs to meet SIP manufacturer's requirements.

B. SIP Installation: Refer to Section 3.2 for instructions.

C. Roof Underlayment: Apply roof underlayment immediately (per APA TT-111B) after SIPs installation is completed; refer to Division 07 roof underlayment section. SIPs exposed to rain, frost or snow must be allowed to dry prior to application of roof underlayment.

3.5 INSTALLATION OF FLOOR SIPs

A. Support: Confirm support structure provides adequate bearing for SIPs to meet SIP manufacturer's requirements.

B. SIP Installation: Refer to Section 3.2 for instructions.

3.6 PROTECTION

A. Construction: Protect installed SIPs from damage during construction.

B. Protect SIPs from weather with temporary protection when rain, frost or snow is present or imminent. SIPs exposed to rain, frost or snow must be allowed to dry prior to covering.

END OF SECTION

PREMIER RECOMMENDATIONS FOR USE OF SIPS.
Also refer to publications of SIPA available at www.premiersips.com:

GENERAL APPLICATIONS:
SIPs create tight building envelopes. Proper HVAC design is critical to ensuring optimum building performance.

SIPs subjected to rain, frost or snow must have moisture condition of SIP facings & joints evaluated prior to covering.

Interior surfaces of SIPs must be covered with a minimum 15-minute thermal barrier, such as 1/2 in. gypsum wallboard or other approved materials. Apply code approved thermal barriers according to SIP manufacturer's recommendations.

For residential buildings, using a certified Home Energy Rater to determine HERS Index is recommended.

For commercial buildings, using the Energy Star Commercial Buildings Program to determine energy use is recommended.

FLOOR APPLICATIONS:
SIP floors may require additional OSB, plywood, or similar underlayment per flooring manufacturer or due to project structural requirements.

Application of fully adhered products to SIP floors is not recommended. A separation layer is recommended to facilitate future flooring replacement.

WALL APPLICATIONS:
SIP walls must be protected on exterior with code compliant weather resistive barrier and cladding. Installation of exterior coverings should occur as soon as possible. Reference "General Applications", above, for moisture conditions.

SIP facings must be fully supported. SIP bottom plate is held back 7/16 in. from edge of foundation to allow for full support of SIP.

Wall Cap plates are used when necessary to meet project structural requirements or provide spacing for SIP wall height.

ROOF APPLICATIONS:
SIP roofs must be protected with code compliant underlayment and roofing. Installation of underlayment and roofing should occur as soon as possible. Reference "General Applications", above, for moisture conditions.

Application of fully adhered roofing products directly to SIP facings is not recommended. A separation layer is recommended to facilitate future roofing replacement.

Special ventilation details are recommended when zinc or copper roof coverings are used. Consult SIP manufacturer's instructions.

Application of peel and stick, or low perm rated underlayment over entire area of SIP roofs is not recommended without special consideration.