ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-4524

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 12 00—Structural Panels

REPORT HOLDER:

PREMIER BUILDING SYSTEMS, LLC

EVALUATION SUBJECT:

PREMIERSIPS: TYPE S, TYPE I AND TYPE L STRUCTURAL INSULATED PANELS:
WALL SIPS: 8 FT. TO 24 FT. TALL, 3-1/2 IN. TO 11-1/4 IN. CORE THICKNESS
FLOOR AND ROOF SIPS: 8 FT. TO 24 FT. LONG, 3-1/2 IN. TO 11-1/4 IN. CORE THICKNESS
HEADER SIPS: 12 IN., 18 IN. AND 24 IN. DEPTHS, 3-1/4 IN. TO 7-1/4 IN. CORE THICKNESS FOR SPANS OF 4 FT. TO 10 FT.

ADDITIONAL LISTEE:

EXTREME PANEL TECHNOLOGIES, INC.

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018 and 2015 *International Building Code*® (IBC)
- 2018 and 2015 *International Residential Code*® (IRC)

Properties evaluated:

- Structural
- Fire resistance

2.0 USES

2.1 General:

PremierSIPs are structural insulated roof, wall and floor panels capable of resisting transverse, axial and in-plane shear loads.

2.2 Construction Types:

PremierSIPs shall be considered combustible building elements when assessing construction type in accordance with IBC Chapter 6.

2.3 Fire Resistive Assemblies:

PremierSIPs may be used as a component of a fire-rated assembly if suitable evidence and details are submitted and approved by the authority having jurisdiction. Details of fire rated assemblies can be found in Section 4.2.11.

3.0 DESCRIPTION

3.1 General:

PremierSIPs are factory-assembled, engineered-wood-faced, structural insulated panels (SIP) with an expanded polystyrene (EPS) foam core. The SIPs are intended for use as load-bearing or non-load bearing wall panels, roof panels, floor panels and headers. The SIPs are available in $3^1/_2$-inch (89 mm) through $11^1/_4$-inch (285. 8 mm) core thicknesses. The SIPs are custom made to the specifications for each use and are assembled under factory-controlled conditions. The maximum SIP size is 8 feet (2.44 m) wide and up to 24 feet (7.32 m) in length.

3.2 Materials:

3.2.1 Facing: The facing consists of two single-ply oriented strand board (OSB) facings, a minimum of $^7/_{16}$-inch (11.1 mm) thick conforming to 2015 IRC Table R610.3.2 and DOC PS 2-92, Exposure 1, Rated Sheathing with a span index of 24/16. Panels may be manufactured with the facing strength axis oriented either parallel or perpendicular to the direction of SIP bending provided the appropriate strength values are used.

3.2.2 Core: The core material is EPS foam conforming to ASTM C578, Type I. The foam core, up to 4 inches (102 mm) thick, has a flame spread rating not exceeding 25 and a smoke-developed rating not exceeding 450 when tested in accordance with ASTM E84. The panels, up to $11^1/_4$ inches (285. 75 mm) core thickness, comply with IBC Section 2603.3 Exception 4.

3.2.3 Adhesive: Facing materials are adhered to the core material using a structural adhesive. The adhesive is applied during the lamination process in accordance with the in-plant quality system documentation.

3.2.4 Material Sources: The facing, core and adhesive used in the construction of *PremierSIPs* shall be composed only of materials from approved sources as identified in the in-plant quality system documentation.

3.2.5 Splines: *PremierSIPs* are interconnected with surface splines or block splines (Type S panels), engineered structural splines (Type I panels) or dimensional lumber splines (Type L panels).

3.2.5.1 Surface Splines: Surface splines (Figure 1) consist of 3-inch- or 4-inch-wide by minimum $^7/_{16}$-inch-thick (76 mm or 102 mm by 11.1 mm) OSB facing material. At each panel joint, one surface spline is inserted into each of two tight-fitting slots in the core. The slots in the core are located just inside the facing.

3.2.5.2 Block Splines: Block splines (Figure 1) are manufactured in the same manner as the SIP except with an overall thickness that is 1 inch (25.4 mm) less than the overall thickness of the panel to be joined.

3.2.5.3 Structural Splines: Structural splines consist of one or more plies of dimensional lumber or an engineered wood product (Figure 1). Acceptable sources for engineered wood products are listed in the manufacturer's quality documentation.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: The scope of this report is limited to the evaluation of the SIP panel component. Panel connections and other details related to incorporation of the panel into the overall structural system of a building are outside the scope of this report.

4.1.2 Design Approval: Where required by the authority having jurisdiction, structures using *PremierSIPs* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details, and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation.

4.1.3 Design Loads: Design loads to be resisted by the SIPs shall be as required under the applicable building code. Loads on the SIPs shall not exceed the loads noted in this report.

4.1.4 Allowable Loads: Allowable axial, transverse, and in-plane shear loads shall be selected from Tables 1 through 10. Calculations demonstrating that the loads applied are less than the allowable loads described in this report shall be submitted to the code official for approval. For loading conditions not specifically addressed herein, structural members designed in accordance with accepted engineering practice shall be provided to meet applicable code requirements.

4.1.5 Concentrated Load: Axial loads shall be applied to the SIP through continuous members such as structural insulated roof or floor panels or repetitive members spaced at regular intervals of 24 inches (610 mm) on center or less. Such members shall be fastened to a rim board or similar member to distribute the load to the SIP. Where a rim board or similar member is not provided, the reaction at the end of each member shall not exceed the concentrated loads provided in Tables 5 through 7.

4.1.6 Eccentric and Side Loads: Axial loads shall be applied concentrically to the top of the SIP. Loads shall not be applied eccentrically or through framing attached to one side of the panel (such as balloon framing) except where additional engineering documentation is provided.

4.1.7 Openings: Except as provided in Tables 8 and 9, openings in panels shall be reinforced with wood or steel designed in accordance with accepted engineering practice to resist all loads applied to the opening as required by the applicable code. Details for door and window openings shall be provided to clarify the manner of supporting axial, transverse and/or in-plane shear loads at openings. Such details shall be shown on approved design documents and subject to approval by the local authority having jurisdiction.

4.1.8 In-Plane Shear Design: Shear walls utilizing block, surface or lumber splines shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 10. Shear wall chords, hold-downs and connections to transfer shear forces between the wall and surrounding structure shall be designed in accordance with accepted engineering practice. The allowable loads provided in Table 10 as published, are limited to assemblies with height-to-width ratios not exceeding those published in Footnote 1 of Table 10. The allowable loads for shear walls with height: width ratios exceeding 2:1 using dimensional lumber splines must be adjusted in accordance with Footnote 5 of Table 10.

4.1.9 Seismic Design Categories A, B and C: The use of the shear wall configurations in Table 10 is limited to structures in Seismic Design Categories A, B and C.

4.1.10 Horizontal Diaphragms: Horizontal diaphragms utilizing surface splines shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 11. Diaphragm chords and connections to transfer shear forces between the diaphragm and surrounding structure shall be designed in accordance with accepted engineering practice. The maximum diaphragm length-to-width ratio shall not exceed those specified in Table 11.

4.1.11 Combined Loads: Panels subjected to any combination of axial, transverse or in-plane shear loads shall be analyzed utilizing a straight line interaction.

4.2 Installation:

4.2.1 General: *PremierSIPs* shall be fabricated, identified and installed in accordance with this report, the approved construction documents and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report shall govern. Approved construction documents shall be available at all times on the jobsite during installation.

4.2.2 Splines: *PremierSIPs* are interconnected at the panel edges through the use of a spline. The spline type may be of any configuration listed in Section 3.2.5 as required by the specific design. The spline shall be secured in place with not less than 0.113-inch x 2.5-inch (2.9 mm x 63.5 mm) smooth shank nails, [0.275 inch (7 mm) head diameter], 6 inches (152 mm) on center on both sides of the SIP or an approved equivalent fastener. All joints shall be sealed in accordance with the SIP manufacturer's installation instructions. Alternate spline connections may be required for SIPs subjected to in-plane shear forces. Such SIPs shall be interconnected exactly as required in Table 10 or Table 11 or as directed by the designer.

4.2.3 Plates: The top and bottom plates of the panels shall be dimensional lumber or engineered wood sized to match the core thickness of the panel. The plates shall be secured using not less than 0.113-inch x 2.5-inch (2.9 mm x 63.5 mm) nails, [0.275-inch (7 mm) head diameter], spaced 6 inches (152 mm) on center on both sides of the panel or an approved equivalent fastener. Alternate plate connections may be required for panels subjected to in-plane shear forces and shall be interconnected as required in Table 10 or Table 11 or as directed by the designer.

4.2.4 Cutting and Notching: No field cutting or routing of the panels shall be permitted except as shown on approved drawings.

4.2.5 Protection from Decay: SIPs that rest on exterior foundation walls shall not be located within 8 inches (203 mm) of exposed earth. SIPs supported by concrete or masonry that is in direct contact with earth shall be protected from the concrete or masonry by a moisture barrier.

4.2.6 Protection from Termites: In areas subject to damage from termites, SIPs shall be protected from termites using an approved method. SIPs shall not be installed below grade or in contact with earth.

4.2.7 Heat-producing Fixtures: Heat-producing fixtures shall not be installed in the SIPs unless protected by a method approved by the code official or documented in test reports. This limitation shall not be interpreted to prohibit heat-producing elements with suitable protection.

4.2.8 Plumbing Installation Restrictions: Plumbing and waste lines may extend at right angles through the wall panels but are not permitted vertically within the core. Lines shall not interrupt splines or panel plates unless approved by a registered design professional.

4.2.9 Voids and Holes:

4.2.9.1 Voids in Core: In lieu of openings designed in accordance with Section 4.1.7, the following voids are permitted. Voids may be provided in the panel core during fabrication at predetermined locations only. Voids parallel to the panel span shall be limited to a single $1^1/_2$-inch (38.1 mm) maximum diameter hole. Such voids shall be spaced a minimum of 4 feet (1.22 m) on center, measured perpendicular to the panel span. Two $^1/_2$-inch-diameter (12.7 mm) holes may be substituted for the single $1^1/_2$-inch-diameter (38.1 mm) hole provided they are maintained parallel and within 2 inches (50.8 mm) of each other. Voids perpendicular to the panel span shall be limited to a single $1^1/_2$-inch-maximum-diameter (38.1 mm) hole placed not closer than 16 inches (406.4 mm) from the support. Additional voids in the same direction shall be spaced not less than 28 inches (711.2 mm) on center.

4.2.9.2 Holes in Panels: Holes may be placed in SIPs during fabrication at predetermined locations only. Except as noted herein, holes shall be limited to 4-inches x 4-inches (102 mm x 102 mm) square. The minimum distance between holes shall not be less than 4 feet (1.22 m) on center measured perpendicular to the panel span and 24 inches (610 mm) on center measured parallel to the panel span. Not more than three holes shall be provided in a single line of holes parallel to the panel span. The holes may intersect voids permitted elsewhere in this report.

When SIPs with a $9^1/_4$-inch (235.0 mm) or $11^1/_4$-inch (285.8 mm) core thickness are used horizontally, holes shall be limited to a maximum 8-inch (203.2 mm) diameter. The minimum distance between holes shall not be less than 4 feet (1.22 m) on center measured perpendicular to the panel span and 4 feet (1.22 m) on center measured parallel to the panel span. The minimum distance from the edge of any hole to the support of any SIP shall not be less than 24 inches (610 mm) and the minimum distance from the edge of any hole to any edge of an individual SIP shall not be less than 19 inches (482.6 mm). When more than three holes are present in a single line parallel to the panel span, the allowable loads in Tables 1 through 3 shall be reduced by 25 percent.

4.2.10 Panel Cladding:

4.2.10.1 Roof Covering: The roof covering, underlayment and flashing shall comply with the applicable codes. All roofing materials must be installed in accordance with the manufacturer's installation instructions. The use of roof coverings requiring the application of heat during installation shall be reviewed and approved by a registered design professional.

4.2.10.2 Exterior Wall Covering: Panels shall be covered on the exterior by a water-resistive barrier as required by the applicable code. The water-resistive barrier shall be attached with flashing in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. The exterior facing of the SIP wall shall be covered with weather protection as required by the applicable building code or other approved materials.

4.2.10.3 Interior Wall Covering: The foam plastic core shall be separated from the interior of the building by an approved thermal barrier of ½-inch (12.7 mm) gypsum wallboard or equivalent thermal barrier where required by IBC Section 2603.4.

4.2.11 Fire-resistance-rated Assemblies:

4.2.11.1 Fire-resistance-rated, limited load-bearing, restrained and unrestrained, floor and ceiling assembly using *PremierSIPs* Type S Structural Insulated Panels – 1 hour (Figure 5).

4.2.11.1.1 (Item No. 1) Structural Insulated Panels: *PremierSIPs* consisting of minimum $7^1/_2$-inch-thick (190.5 mm) expanded polystyrene (EPS) core laminated between two sheets of minimum $^7/_{16}$-inch-thick (11.1 mm) oriented strand board (OSB). Panels shall bear the ICC-ES Evaluation Report number or ICC NTA, LLC certification mark. Maximum uniform transverse load shall not exceed 77 percent of the allowable load in Table 1.

4.2.11.1.2 (Item No. 2) Gypsum Board: For ceiling (exposed side), U.S. Gypsum, *Firecode* (Type X) $^5/_8$-inch-thick (15.9 mm), 4-foot-wide (1.22 m) by 10-foot-long (3.05 m), applied in two layers. Inner layer installed with gypsum long dimension parallel to SIP spline and offset a minimum of 24 inches (610 mm) from the SIP spline joints. Gypsum joints perpendicular to SIP spline shall be staggered in adjacent panels not less than 7 feet (2.1 m). Inner layer shall be secured to the OSB with No. 6 x $1^1/_4$-inch (31.75 mm), Type S, bugle head drywall screws spaced 12 inches (304.8 mm) on center and in rows 24 inches (610 mm) on center. Second layer installed at right angles to inner layer with all joints offset not less than 24 inches (610 mm) from the inner layer. Second layer secured with No. 7 x 2-inch (50.8 mm), Type S, bugle head drywall screws spaced 12 inches (304.8 mm) on center and in rows spaced 16 inches (406.4 mm) on center. Gypsum board joints in the second layer shall be covered with paper joint tape and joint compound. Screw heads shall be covered with joint compound.

4.2.11.1.3 (Item No. 3) Surface Spline: Minimum $^7/_{16}$-inch-thick (11.1 mm) by minimum $3^1/_2$-inch (88.9 mm) OSB placed in preformed slots below top (unexposed side). Spline secured with No. 6 x $1^1/_4$-inch (31.75 mm), Type S, bugle head drywall screws spaced 6 inches (152.4 mm) on center on each side of SIP joint. Block splines, consisting of $^7/_{16}$-inch-thick (11.1 mm) OSB laminated to nominal $6^1/_2$-inch (165.1 mm) EPS, are an acceptable alternative to surface splines.

4.2.11.2 Fire-resistance-rated, limited load-bearing wall assembly using *PremierSIPs* Type L Structural Insulated Panels – 1 hour (Figure 6):

4.2.11.2.1 (Item No. 1) Structural Insulated Panels: *PremierSIPs* consisting of minimum $5^1/_2$-inch-thick (139.7 mm) expanded polystyrene (EPS) core laminated between two sheets of minimum $^7/_{16}$-inch-thick (11.1 mm)

oriented strand board (OSB). Panels shall bear the ICC-ES Evaluation Report number or ICC NTA, LLC certification mark. Maximum axial compression load shall not exceed 37 percent of the allowable axial load in Table 6.

4.2.11.2.2 (Item No. 2) Gypsum Board: Standard Gypsum's Type SG-C, *TE generation 3* (Type C) $^5/_8$-inch-thick (15.9 mm), 4-foot-wide (1.22 m) by 10-foot-long (3.05 m), applied vertically in a single layer on both sides of the SIP. Vertical gypsum joints offset a minimum of 12 inches (304.8 mm) from SIP spline joints. Gypsum secured to the OSB with $1^5/_8$-inch-long (41.3 mm) PC cupped head drywall nails spaced 12 inches (304.8 mm) on center vertically and 16 inches (406.4 mm) on center horizontally. Gypsum board joints are covered with paper joint tape and joint compound. Nail heads are covered with joint compound.

4.2.11.2.3 (Item No. 3) Spline: Double 2x6 #2 Hem-Fir dimensional lumber. Double lumber members shall be nailed together with 0.148-inch x $3^1/_4$-inch (3.76 mm x 82.6 mm) coated sinker nails (16d) spaced 24 inches (610 mm) on center staggered along the spline length. The double lumber spline shall be installed in the recesses between adjacent SIPs and secured to the OSB with 0.122-inch x 2-inch (3.1 mm x 50.8 mm) (6d common) nails spaced 6 inches (152.4 mm) on center. Caulk complying with ASTM C834 shall be applied to the spline surfaces in contact with the EPS.

4.2.11.2.4 (item No. 4) Top Plate: Double 2x6 #2 Hem-Fir dimensional lumber. The first plate shall be installed in a 3-inch-deep (76.2 mm) recess at the top of the SIP and secured to the OSB facings with 0.122-inch x 2-inch (3.1 mm x 50.8 mm) (6d common) nails spaced 6 inches (152.4 mm) on center. The first plate shall also be secured to each spline with two 0.148-inch x $3^1/_4$-inch (3.76 mm x 82.6 mm) (16d common) nails. The second plate shall be placed above the first plate and secured to the OSB facings with 0.122-inch x 2-inch (3.1 mm x 50.8 mm) (6d common) nails spaced 6 inches (152.4 mm) on center. The second plate shall also be secured to the first plate with 0.148-inch x $3^1/_4$-inch (3.76 mm x 82.6 mm) coated sinker nails (16d) spaced 16 inches (406.4 mm) on center staggered along the plate length. Caulk complying with ASTM C834 shall be applied to the plate surfaces in contact with the EPS.

4.2.11.2.5 (Item No.5) Bottom Plate: Single 2x6 No. 2 Hem-Fir dimensional lumber. The plate shall be installed in a $1^1/_2$-inch-deep (38.1 mm) recess at the bottom of the panel and secured to the OSB facings with 0.122-inch x 2-inch (3.1 mm x 50.8 mm) (6d common) nails spaced 6 inches (152.4 mm) on center. The plate shall also be secured to each spline with two 0.148-inch x $3^1/_4$-inch (3.76 mm x 82.6 mm) (16d common) nails. Caulk complying with ASTM C834 shall be applied to the plate surfaces in contact with the EPS.

5.0 CONDITIONS OF USE

PremierSIPs as described in this report comply with the codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation complies with this report and the approved construction documents.

5.2 This report applies only to the panel thicknesses specifically listed herein.

5.3 In use panel heights/spans shall not exceed the values listed herein. Extrapolation beyond the values listed herein is not permitted.

5.4 The panels are produced in the production facilities in Puyallup, Washington and Cottonwood, Minnesota under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Reports of axial load, transverse load, and in-plane racking shear tests of panels in accordance with the general guidelines of ASTM E72.

6.2 Reports of tests conducted in accordance with ASTM E119.

6.3 Reports of tests conducted in accordance with ASTM E455.

6.4 Reports of tests related to header loads.

7.0 IDENTIFICATION

7.1 *PremierSIPs* are identified with the following information:

7.1.1 The ICC-ES Evaluation Report number (ESR-4524), or ICC NTA, LLC. certification mark (either NTA's NER No. PRS032808-3 or NTA's NER No. NER-1009)

7.1.2 In-plant quality assurance stamp

7.1.3 Company name (Premier Building Systems, LLC or Extreme Panel Technologies, Inc.)

7.1.4 Project or batch number

7.2 The report holder's contact information is the following:

PREMIER BUILDING SYSTEMS, LLC
18504 CANYON ROAD EAST
PUYALLUP, WA 98375

7.3 The Additional Listee's contact information is the following:

EXTREME PANEL TECHNOLOGIES, INC.
475 EAST 4TH STREET NORTH
COTTONWOOD, MN 56229

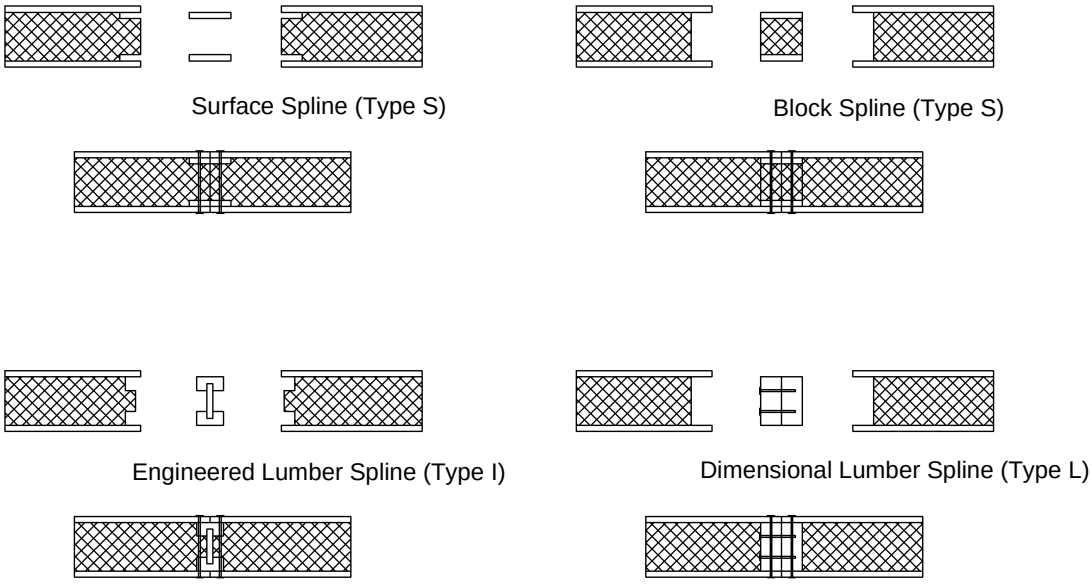


FIGURE 1—SIP SPLINE TYPES

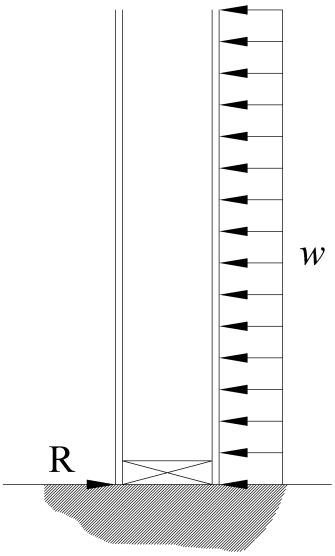


FIGURE 2—ZERO BEARING SUPPORT

TABLE 1—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD, ROOF/FLOOR (psf) – TYPE S PANELS[1,3]

PANEL THICKNESS (inches)	DEFLECTION LIMIT[2]	PANEL SPAN (feet)									
		4[4]	8	10	12	14	16	18	20	22	24
4.5	L/360	100	32	23	18	14	11				
	L/240	143	48	35	27	21	16				
	L/180	143	63	47	36	28	22				
6.5	L/360	105	51	38	29	23	19	15	12		
	L/240	162	76	57	44	35	28	23	19		
	L/180	191	80	61	50	42	36	30	24		
8.25	L/360	120	67	51	40	32	26	22	18	15	13
	L/240	179	94	71	57	48	40	33	27	23	19
	L/180	179	94	71	57	48	41	36	32	26	22
10.25	L/360	131	86	66	52	43	35	29	25	21	18
	L/240	168	94	75	63	54	47	41	36	32	27
	L/180	168	94	75	63	54	47	41	36	33	28
12.25	L/360	132	94	75	63	53	44	37	32	27	23
	L/240	163	94	75	63	54	47	42	37	34	31
	L/180	163	94	75	63	54	47	42	37	34	31

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa.

[1] Table values assume a simply supported panel with $1^1/_2$-inches (38.1 mm) of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load. Values do not include the dead weight of the panel.
[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code. Values are based on loads of short duration only and do not consider the effects of creep.
[3] Table values for 8-foot (2.44 m) spans apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to span direction. Table values for other spans are based on the OSB strength axis oriented parallel to the span direction.
[4] Panels spanning 4 feet (1.22 m) shall be a minimum of 8-foot (2.44 m) long spanning two 4-foot (1.22 m) spans.

TABLE 2—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD, WALL (psf) – TYPE S PANELS[1,3]

PANEL THICKNESS (inches)	DEFLECTION LIMIT[2]	PANEL SPAN (feet)								
		8	10	12	14	16	18	20	22	24
4.5	L/360	32	23	18	14	11				
	L/240	48	35	27	21	16				
	L/180	55	44	36	28	22				
6.5	L/360	51	38	29	23	19	15	12		
	L/240	67	53	44	35	28	23	19		
	L/180	67	53	44	38	33	29	24		
8.25	L/360	67	51	40	32	26	22	18	15	13
	L/240	75	60	50	42	37	33	27	23	19
	L/180	75	60	50	42	37	33	30	26	22
10.25	L/360	83	66	52	43	35	29	25	21	18
	L/240	83	66	55	47	41	36	33	30	27
	L/180	83	66	55	47	41	36	33	30	27
12.25	L/360	89	72	60	51	44	37	32	27	23
	L/240	89	72	60	51	45	40	36	32	30
	L/180	89	72	60	51	45	40	36	32	30

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa.

[1] Table values assume an end-supported panel with zero bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code. Values are based on loads of short duration only and do not consider the effects of creep.

[3] Table values for 8-foot (2.44 m) spans apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to span direction. Table values for other spans are based on the OSB strength axis oriented parallel to the span direction.

TABLE 3—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD (psf) – TYPE I PANELS[1,3]

PANEL CORE THICKNESS (inches)	DEFLECTION LIMIT[2]	PANEL SPAN (feet)									
		4[4]	8	10	12	14	16	18	20	22	24
7.25	L/360	132	136	93	60	50	40	31	21	19	16
	L/240	318*	148*	107*	91	75	59	45	31	27	23
	L/180	318*	148*	107*	92*	87	78	60	41	36	30
9.25	L/360	197	164*	124*	72	67	61	48	34	29	24
	L/240	336*	164*	124*	107*	96	84*	70	49	43	36
	L/180	336*	164*	124*	107*	96	84*	76	65	56	47
11.25	L/360	258	143*	103*	86	83	77*	61	42	37	32
	L/240	318*	143*	103*	93*	85	77*	68	59*	54	46
	L/180	318*	143*	103*	93*	85	77*	68	59*	54	49*

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa.

[1]Table values assume a simply supported panel with $1^1/_2$-inches (38.1 mm) of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load. Splines consist of one wood I-beam, $2^1/_4$-inch (57.2 mm) wide flange (minimum) with a depth equal to the core thickness, spaced not to exceed 48 inches (1219.2 mm) on center.
[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.
[3] Tabulated values for 8-foot (2.44 m) walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.
[4] Panels spanning 4 feet (1.22 m) shall be a minimum of 8 foot (2.44 m) long spanning a minimum of two 4-foot (1.22 m) spans. No single span condition is allowed.
*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

TABLE 4—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD (psf) – TYPE L PANELS[1,3]

PANEL CORE THICKNESS (inches)	DEFLECTION LIMIT[2]	PANEL SPAN (feet)									
		4[4]	8	10	12	14	16	18	20	22	24
3.5	L/360	103	45	33	24	18	11				
	L/240	225	68	47	34	26	17				
	L/180	297*	91	61	45	34	23				
5.5	L/360	307*	129	57	42	34	25	20	15		
	L/240	307*	182*	87	61	49	37	30	22		
	L/180	307*	182*	112*	80	65	49	39	29		
7.25	L/360	253	171	82	66	54	41	32	23		
	L/240	288*	188*	128	100	81	61	48	35		
	L/180	288*	188*	133*	117*	105	80	63	45		
9.25	L/360	286	188*	117	101	80	58	47	36	32	27
	L/240	326*	188*	147*	134*	120	90	71	52	47	41
	L/180	326*	188*	147*	134*	121	108*	93	68	61	53
11.25	L/360	327*	188*	167*	141	116	91	75	58	47	36
	L/240	327*	188*	167*	153*	132	110*	97	83*	69	53
	L/180	327*	188*	167*	153*	132	110*	97	83*	83	70

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa.

[1]Table values assume a simply supported panel with $1^1/_2$-inches (38.1 mm) of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load. Splines consist of No. 2 or better, Hem-Fir, $1^1/_2$ inches (38.1 mm) wide with a depth equal to the core thickness, spaced to provide not less than two members for every 48 inches (1219.2 mm) of panel width.
[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.
[3] Tabulated values for 8-foot (2.44 m) walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.
[4] Panels spanning 4 feet (1.22 m) shall be a minimum of 8 foot (2.44 m) long spanning a minimum of two 4-foot (1.22 m) spans. No single span condition is allowed.
*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

TABLE 5—MAXIMUM ALLOWABLE UNIFORM AXIAL LOAD (plf) – TYPE S PANELS[1,2,3,4]

PANEL CORE THICKNESS (inch)	PANEL SPAN (feet)					
	8	10	12	16	20	24
3.5	3500	2553	2453	2117		
5.5	4250	4043	3373	3923	2817	2183
7.25	4917	4327	4473	4197	3497	3067
9.25	4600	4414	4228	4417	3389	3248
11.25	3889	3959	4028	4408	3837*	3333

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa; 1 plf = 14.6 N/m.

[1] Splines consist of OSB surface splines not less than $^{7}/_{16}$ inch (11.1 mm) thick inserted below the facing on each side of the panel. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

[2] Uniform axial loads may be applied in accordance with Section 4.1.4. Concentrated point loads shall be addressed in accordance with Section 4.1.5 and Table 6.

[3] Both facings must bear on the supporting foundation or structure.

[4] Tabulated values for 8-foot (2.44 m) walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports.

* Limited by $^{1}/_{8}$ inch (3.2 mm) deflection (compression)

TABLE 6—MAXIMUM ALLOWABLE UNIFORM AXIAL LOADS (plf) – TYPE L PANELS[1,2,3,4]

PANEL CORE THICKNESS (inch)	PANEL SPAN (feet)					
	8	10	12	16	20	24
3.5	4723	3903	3273	2623		
5.5	5850	5890	4277	4310	2933	2837
7.25	6807	6110	5557	5180	4837	4083
9.25	5473	5709	5946	5948	4729*	4250
11.25	5667	5474	5281	5775*	4729*	4223

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa; 1 plf = 14.6 N/m.

[1] Splines consist of No. 2 or better, Hem-Fir, $1^{1}/_{2}$-inches (38.1 mm) wide with a depth equal to the core thickness, spaced to provide not less than two members for every 48 inches (1219.2 mm) of panel width. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

[2] Axial loads shall be applied concentrically to the top of the panel through repetitive members spaced not more than 24 inches (609.6 mm) on center. Such members shall be fastened to a rim board or similar member to distribute along the top of the SIP panel.

[3] Both facings must bear on the supporting foundation or structure.

[4] Tabulated values for 8-foot (2.44 m) walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports.

* Limited by $^{1}/_{8}$ inch (3.2 mm) deflection (compression)

TABLE 7—MAXIMUM ALLOWABLE AXIAL COMPRESSION POINT LOADS (lbs) – TYPE S PANELS[1,2,3,4]

TOP PLATE CONFIGURATION	$1^{1}/_{2}$" MINIMUM BEARING WIDTH	3" MINIMUM BEARING WIDTH
Single 2x4 No. 2 or Better Hem-Fir Plate	2040	2450
Single 2x4 No. 2 or Better Hem-Fir Plate with $1^{1}/_{8}$ in. wide, 1.3E Rim Board Cap Plate	4030	4678

For **SI:** 1 inch = 25.4 mm; 1 lb = 4.45 N.

[1] Top plate secured to facings as required in Section 4.2.3.

[2] Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

[3] Concentrated loads shall be applied concentrically to the top of the panel.

[4] Tabulated values are based on the strong-axis of the facing material oriented parallel to the span direction.

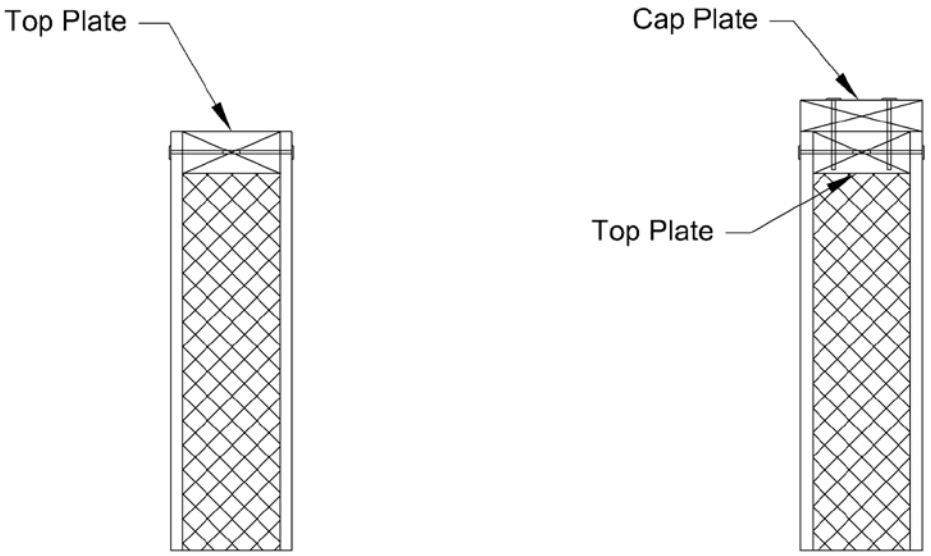


FIGURE 3—TOP PLATE CONFIGURATIONS

TABLE 8—MAXIMUM ALLOWABLE UNIFORM SIP HEADER VERTICAL LOADS (plf)
$3^1/_2$ INCH THROUGH $11^1/_4$ INCH CORE THICKNESS[1,2]

HEADER DEPTH[3] (inches)	DEFLECTION LIMIT[4]	HEADER SPAN (feet)			
		4	6	8	10
12	L/480	740	384	228	142
	L/360	740	384	229	142
	L/240	740	384	229	142
18	L/480	798	574	385	311
	L/360	798	574	385	311
	L/240	798	574	385	311
24	L/480	886	629	429	361
	L/360	886	629	429	361
	L/240	886	629	429	361

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa; 1 plf = 14.6 N/m.

[1] Vertical loads only. Lateral loads shall be transferred to the edges of the openings through continuous plate(s) designed in accordance with accepted engineering practice. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

[2] Tabulated values are based on the strong-axis of the facing material oriented perpendicular to the direction of header span.

[3] Minimum depth of facing above opening.

[4] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

TABLE 9—MAXIMUM ALLOWABLE UNIFORM HEADER LOADS (plf)
(PANEL SPLICE A MINIMUM OF 6 INCH FROM EDGE OF OPENING) $3^1/_2$ INCH THROUGH $11^1/_4$ INCH CORE THICKNESS[1,2]

HEADER DEPTH[3] (inches)	DEFLECTION LIMIT[4]	HEADER SPAN (feet)			
		4	6	8	10
12	L/480	345	243	156	99
	L/360	450	295	190	125
	L/240	630	382	236	153
18	L/480	705	388	254	235
	L/360	750	482	302	281
	L/240	750	482	302	281
24	L/480	698	556	368	350
	L/360	896	556	368	350
	L/240	896	556	368	350

For **SI:** 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 psf = 0.0479 kPa; 1 plf = 14.6 N/m.

[1] Vertical loads only. Lateral loads shall be transferred to the edges of the openings through continuous plate(s) designed in accordance with accepted engineering practice. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] Tabulated values are based on the strong-axis of the facing material oriented perpendicular to the direction of header span.
[3] Minimum depth of facing above opening.
[4] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

TABLE 10—ALLOWABLE IN-PLANE RACKING SHEAR STRENGTH
FOR SIP SHEAR WALLS $3^1/_2$ INCH THROUGH $11^1/_4$ INCH CORE THICKNESS
WIND AND SEISMIC LOADS IN SEISMIC DESIGN CATEGORIES A, B AND C[1]

SPLINE TYPE[3]	FRAMING MINIMUM SG[4]	MINIMUM FACING CONNECTIONS[4]			ALLOWABLE SHEAR LOAD[5] (plf)
		Chord[2, 3]	Plate[2]	Spline[3]	
Block, Surface or Lumber Spline (Type S or Type L)	0.50	0.113”x 2-1/2” nails, 6” on center	0.113”x 2-1/2” nails, 6” on center	(7/16” thick, 3” wide spline) 0.113”x 2-1/2” nails, 6” on center	410
	0.50	0.113”x 2-3/8” nails, 6” on center stagger (2 rows)	0.113”x 2-3/8” nails, 6” on center	(7/16” thick, 4” wide spline) 0.113”x 2-3/8” nails, 6” on center	460
	0.42	0.113”x 2-3/8” nails, 6” on center stagger (2 rows)	0.113”x 2-3/8” nails, 4” on center stagger (2 rows)	(7/16” thick, 4” wide spline) 0.113”x 2-3/8” nails, 4” on center	700
	0.42	0.148”x 2-3/8” nails, 6” on center stagger (2 rows)	0.148”x 2-3/8” nails, 3” on center	(23/32” thick, 4” wide spline) 0.148”x 2-3/8” nails, 3” on center stagger (2 rows)	1000

For **SI:** 1 inch = 25.4 mm; 1 plf = 14.6 N/m.

[1] Shear strength values, as published in this table, are limited to assemblies resisting wind or seismic forces when the aspect ratio (height:width) does not exceed 2:1.
[2] Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.
[3] Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.
[4] Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.
[5] For design to resist seismic forces, shear wall height-width ratios greater than 2:1, but not exceeding 3.5:1, are permitted for assemblies using lumber splines provided the allowable shear strength values in this table are multiplied by 2w/h.

TABLE 11—MAXIMUM ALLOWABLE IN-PLANE SHEAR FOR DIAPHRAGMS SUBJECTED TO WIND OR SEISMIC LOADING[1]

MINIMUM CONNECTIONS[2]				ALLOWABLE SHEAR LOAD (plf)	G' APPARENT SHEAR STIFFNESS (lbf/in)	MAXIMUM ASPECT RATIO
Interior Supports[2] (Figure 4A)	Surface Spline[3] (Figure 4B)	Boundary[4] (Figure 4C)				
		Support	Spline			
PBS No. 14 Panel Screw with 1" penetration 12" on center	0.113" x 2.5" nails, 3" on center 7/16" x 4" OSB Spline	PBS No.14 Panel Screw with 1" penetration 12" on center	0.113" x 2.5" nails, 6" on center	430	24000	4:1
PBS No.14 Panel Screw with 1" penetration 12" on center	0.113" x 2.5" nails, 3" on center, 2 rows, staggered 7/16" x 4" OSB Spline	PBS No.14 Panel Screw with 1" penetration 3" on center	0.113" x 2.5" nails, 4" on center	530	30300	4:1
PBS No.14 Panel Screw with 1" penetration 2" on center	0.113" x 2.5" nails, 3" on center, 2 rows, staggered 7/16" x 4" OSB Spline	PBS No.14 Panel Screw with 1" penetration 2" on center	0.113" x 2.5" nails, 1.5" on center	750	41300	4:1
PBS No.14 Panel Screw with 1" penetration 4" on center	0.113" x 2.5" nails, 3" on center, 2 rows, staggered 7/16" x 4" OSB Spline	PBS No.14 Panel Screw with 1" penetration 4" on center	0.113" x2 .5" nails, 3" on center	915	93700	3:1
PBS No.14 Panel Screw with 1" penetration 4" on center	0.113" x 2.5" nails, 6" on center, 2 rows, staggered 23/32" x 4" OSB Spline	PBS No.14 Panel Screw with 1" penetration 4" on center	0.113" x 2.5" nails, 6" on center	1130	110600	3:1

For **SI:** 1 inch = 25.4 mm; 1 lb = 4.45 N; 1 plf = 14.6 N/m.

[1] The maximum diaphragm length-to-width ratio of shall not exceed 4:1. Load may be applied parallel to continuous panel joints.

[2] Interior supports shall be spaced not to exceed 12 feet (3.66 mm) on center and have a minimum width of $3^1/_2$ inches (88.9 mm) and a specific gravity of 0.42 or greater. Specified fasteners are required on both sides of panel joint where panels are joined over a support. See Figure 4A.

[3] Top spline only, at interior panel-to-panel joints. Specified fasteners are required on both sides of panel joint. See Figure 4B.

[4] Boundary spline shall be solid $1^1/_2$ inches (38.1 mm) wide, minimum, and have a specific gravity of 0.42 or greater. Boundary supports shall have a minimum width of $3^1/_2$ inches (88.9 mm) and a specific gravity of 0.42 or greater. Specified spline fasteners are required through both facings. See Figure 4C.

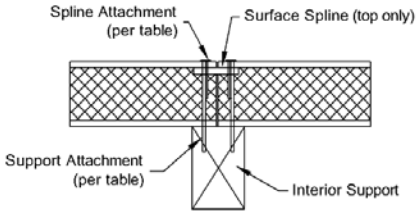


FIGURE 4A—INTERIOR SUPPORT

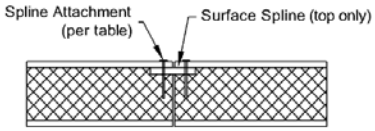


FIGURE 4B—SURFACE SPLINE

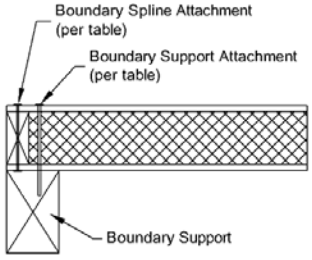
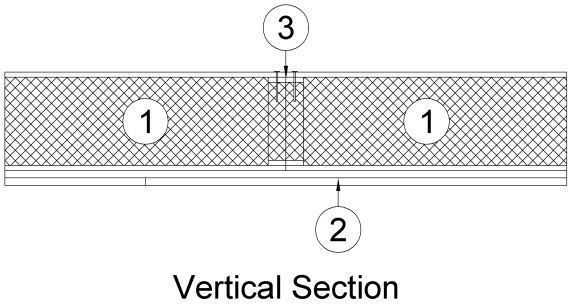


FIGURE 4C—BOUNDARY

FIGURE 4—DIAPHRAGM CONNECTION TYPES

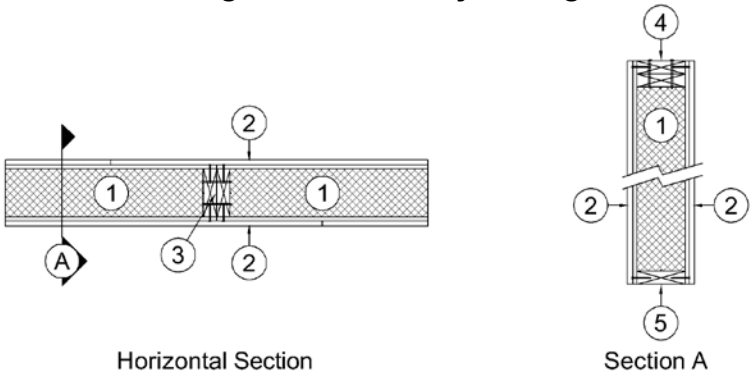
Load-Bearing, Restrained Floor/Ceiling Assembly Rating – 1 Hour
Load-Bearing, Unrestrained Floor/Ceiling Assembly Rating – 1 Hour



Vertical Section

FIGURE 5—ASSEMBLY DRAWING FOR FIRE RESISTANCE

Load-Bearing Wall Assembly Rating – 1 Hour



Horizontal Section Section A

FIGURE 6—ASSEMBLY DRAWING FOR FIRE RESISTANCE