



# ICC-ES Evaluation Report

## ESR-5318

Issued August 2023

This report is subject to renewal August 2024.

### DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 12 00—Structural Panels

#### REPORT HOLDER:

PREFLEX

#### EVALUATION SUBJECT:

STRUCTURAL INSULATED PANELS (SIPS)

### 1.0 EVALUATION SCOPE

#### Compliance with the following codes:

- 2021 and 2018 *International Building Code*® (IBC)
- 2021 and 2018 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and Division of State Architect (DSA), see [ESR-5318 CBC and CRC Supplement](#).

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see [ESR-5318 LABC and LARC Supplement](#).

#### Properties evaluated:

- Structural
- Thermal Barrier
- Seismic Performance

### 2.0 USES

Structural Insulated Panels (SIPs) are used as roof and floor panels as well as load-bearing and nonload-bearing wall panels of Type V construction. The panels are alternatives to walls, floors and roofs designed and fabricated in accordance with IBC Section 2306.

The panels are alternatives to walls, floors, and roofs prescribed in IRC Sections R502, R602, and R802. When panels are installed under the IRC, an engineered design is required in accordance with IRC Section R301.1.3 and Section 4.1.1 of this report. Use of the panels under IRC Section R610 is outside scope of this evaluation report.

### 3.0 DESCRIPTION

#### 3.1 General:

SIPs are factory-assembled, engineered-wood-faced, structural insulated panels (SIP) with an expanded polystyrene (EPS) foam core. SIPs are intended for use as load-bearing or non-load bearing wall panels, roof panels and floor panels. SIPs are available in 4<sup>1</sup>/<sub>2</sub>-inch (114 mm) through 12<sup>1</sup>/<sub>4</sub>-inch (311 mm) thicknesses. SIPs are custom made to the specifications for each use and are assembled under factory-controlled conditions. The maximum SIPs size is 8 feet (2.44 m) wide and up to 24 feet (7.31 m) in length.

#### 3.2 Materials:

**3.2.1 Facing:** The facing material is a minimum <sup>7</sup>/<sub>16</sub>-inch-thick, Exposure 1 oriented strand board (OSB) with a 24/16 span rating and complying with DOC PS2. The OSB facings are continuous for each SIP. The facing may be oriented in the weak or strong axis as shown in the tables in this report.

**3.2.2 Expanded Polystyrene (EPS) Core:** The EPS foam plastic core complies with ASTM C578, Type I. The EPS foam plastic has a flame spread rating not exceeding 25 and a smoke-developed rating not exceeding 450 when tested in accordance with ASTM E84. The EPS cores for SIPs up to 12<sup>1</sup>/<sub>4</sub>-inch (311 mm) thickness, comply with IBC Section 2603.3 Exception 4 and IRC Section R316.3.2.

**3.2.3 Adhesive:** The adhesive is a Type II, Class 2 laminating adhesive complying with the ICC-ES Acceptance Criteria for Sandwich Panel Adhesive (AC05) as specified in the approved quality control documentation.

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

**3.2.5 Splines:** There are two types of splines: Block splines and solid-sawn dimensional lumber.

Block splines (Figure 1) are 3-inch-wide (76 mm) sections of SIPs manufactured with a total thickness to match the core thickness of the sandwich panel for which the block spline is to be used. The dimensional lumber splines are nominal 2-by, No. 2 or better spruce-pine-fir, dimensional lumber members, with depth sized to match the core thickness, unless noted otherwise in this evaluation report.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

**4.1.1 General:** The scope of this report is limited to the evaluation of SIPs. 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 Loads:** Design loads to be resisted by the SIPs shall be as required under the applicable building code. Design loads on the SIPs shall not exceed the loads noted in this report.

**4.1.3 Allowable Loads:** Allowable axial, transverse, and in-plane shear loads shall be selected from Tables 1 through 9. Calculations demonstrating that the design 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.

**4.1.4 In-Plane Shear Design:** Shear walls utilizing box/block or lumber splines shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Tables 8 and 9. 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 8 and 9, are limited to assemblies with height-to-width ratios not exceeding those published in Footnotes 1 and 2 of Table 8 and Footnote 1 of Table 9.

**4.1.4.1 Seismic Design Categories A, B and C (IBC and IRC):** The use of the shear wall configuration in Table 8 is limited to structures in Seismic Design Categories A, B and C.

**4.1.4.2 Seismic Design Categories A through F (IBC and A through E (IRC):** The use of the shear wall configuration in Table 9 may be used in Seismic Design Categories A through F (IBC) and A through E (IRC). The SIP shear walls may be used as components within a seismic-force-resisting system consisting of light-framed load bearing wood walls with wood structural panels defined in Table 12.2-1 of ASCE/SEI 7-16, subject to the using the following seismic design coefficients: Response Modification Coefficient,  $R$  of 6.5; System Overstrength Factor,  $\Omega_o$ , of 3; and Deflection Amplification Factor,  $C_d$  of 4. Analysis and design of structures incorporating SIP shear walls must comply with the applicable code, including IBC Section 1604.4. Where SIP shear walls of the same height but different widths are placed in a wall and/or combined with other shear resisting elements, the applied loads must be proportioned based on relative lateral stiffness of the vertical resisting elements in accordance with Section 12.8.4 of ASCE/SEI 7-16.

**4.1.5 Openings:** Openings in panels shall be reinforced with wood or steel framing members 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.

**4.1.6 Horizontal Diaphragms:** Horizontal diaphragms utilizing SIPs have not been evaluated and are outside the scope of this report.

**4.1.7 Combined Loads:** Where loading conditions result in the panels resisting combined loads, the sum of the ratios of design loads over allowable loads must be equal to or less than 1.0.

### 4.2 Installation:

**4.2.1 General:** Approved construction documents shall be available at all times on the jobsite during installation.

**4.2.2 Splines:** SIPs 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 facers or an approved equivalent fastener. All joints shall be sealed in accordance with the SIPs 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 8 or Table 9 or as directed by the designer.

**4.2.3 Plates:** The top and bottom plates of the panels shall be 2-by dimensional lumber sized to match the core thickness of the panel. The sill and cap plate shall be 2-by dimensional lumber sized to match the panel thickness. The lumber shall have minimum specific gravity of 0.42. The sill and cap plate shall be attached to the top and bottom plate, respectively, using two (2) rows of 0.131-inch x 3-inch (3.3 mm x 76 mm) nails, spaced 16 inches (406 mm) on center along the length of the plate. The facer shall be attached to top and bottom plates 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 facers or an approved equivalent fastener. Alternate plate connections may be required for SIPs subjected to in-plane shear forces in accordance with Table 8 or 9 or as directed by the designer.

### 4.2.4 Thermal Barrier:

**4.2.4.1 Thermal Barrier at Wall, Roof and Floor:** One-half-inch thick (12.7 mm), regular gypsum wallboard, complying with ASTM C36 or ASTM C1396, must be installed on the interior surface of wall and roof panels, and the bottom side of floor panels having occupied space below the floor panel. The wallboard must be fastened to the face of the panels with minimum 1<sup>1</sup>/<sub>4</sub>-inch-long (31.7 mm), No. 6, Type W drywall screws spaced in accordance with ASTM C840 for use under the IBC or Table R702.3.5 of the IRC, using 16-inch-on-center (406.4 mm) framing spacing guidelines.

**4.2.4.2 Thermal Barrier at Floor Surface:** An approved thermal barrier must be installed over the top surface of the floor panels, such as minimum 7<sup>1</sup>/<sub>16</sub>-inch-thick (76 mm) wood-based structural use sheathing installed in accordance with the applicable code.

**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 Panel Cladding:

**4.2.6.1 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.

**4.2.6.2 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.

#### 5.0 CONDITIONS OF USE

The Structural Insulated Panels (SIPs) described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The panels must be fabricated, identified and installed in accordance with this report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published installation instructions, the more restrictive governs.
- 5.2 Design loads to be resisted by the panels must be determined in accordance with the applicable code, and must be equal to, or less than, the values given in Tables 1 through 9 of this report.
- 5.3 All construction documents specifying the SIPs described in this report must comply with design limitations of this report.
- 5.4 Use of the panels is limited to Type V construction.
- 5.5 The panels are produced under an approved quality control program with inspections by ICC-ES.

#### 6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with ICC-ES AC04 Acceptance Criteria for Sandwich Panels Approved June 2019 (editorially revised December 2020).
- 6.2 Reports of test conducted in accordance with NFPA 286.

#### 7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5318) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, the panels are identified by a label including the address of the report holder and batch code.
- 7.3 The report holder's contact information is the following:

**PREFLEX**  
**1145 22<sup>ND</sup> STREET**  
**SAN DIEGO, CALIFORNIA 92102**  
**(424) 394-8884**  
[WWW.PREFLEXINC.COM](http://WWW.PREFLEXINC.COM)

**TABLE 1—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD FOR 4½-INCH-THICK PANELS (ZERO BEARING CONDITION)**  
1,2,3,4,5,6

PANEL LENGTH OR SPAN (feet)	DEFLECTION LIMIT	ALLOWABLE UNIFORM LOAD (psf)			
		LOAD TYPE			
		Roof/Floor Live Load plus Downward Wind Load	Roof Snow Load plus Downward Wind Load	Roof Wind Uplift Load	Wall Wind Load (positive and negative)
8	L/360	23	13	31	28
	L/240	37	23	45	42
	L/180	39	32	47	44
8WAB	L/360	22	13	30	27
	L/240	35	21	43	40
	L/180	48	30	56	53
10	L/360	14	-	22	19
	L/240	23	15	31	28
	L/180	30	21	38	35
12	L/360	21	-	16	13
	L/240	14	-	22	19
	L/180	-	14	29	26
14	L/360	-	-	12	-
	L/240	13	-	17	14
	L/180	-	-	21	18
16	L/360	-	-	-	-
	L/240	-	-	13	10
	L/180	-	-	17	14

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

<sup>1</sup> Tabulated values are for uniform loads simply supported with zero bearing on facing at supports with top and bottom plates inserted in accordance with Section 4.2.3. Where nonuniform loads are applied to the panels, additional engineering analysis must be submitted by registered design professional. Tabulated values for permanent loading include a creep factor.

<sup>2</sup> Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

<sup>3</sup> Tabulated values are for panels constructed with the OSB strength axis oriented parallel to span direction. Tabulated values for 8 foot long weak axis bearing (WAB) are applicable to SIPs installed with the strong axis of the OSB facings perpendicular the SIP length.

<sup>4</sup> Panel self-weight dead load are included in the load combinations. Additional dead loads must also be included in the load combinations.

<sup>5</sup>Where core splices are incorporated into the panels, splices shall be located such that the applied shear load at the splice does not exceed 266 lbs per foot of width. Core splices greater than six inches from the panel end will not be controlled by core splice shear load.

<sup>6</sup>Where maintenance worker roof live load of 300 lbf. is required under the IBC, the allowable spans must be determined by registered design professional.

TABLE 2—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD FOR 6½-INCH-THICK PANELS (ZERO BEARING CONDITION)  
1,2,3,4,5,6

PANEL LENGTH OR SPAN (feet)	DEFLECTION LIMIT <sup>2</sup>	ALLOWABLE UNIFORM LOAD (psf)			
		LOAD TYPE			
		Roof/Floor Live Load plus Downward Wind Load	Roof Snow Load plus Downward Wind Load	Roof Wind Uplift Load	Wall Wind Load (positive and negative)
8	L/360	40	24	48	45
	L/240	56	38	64	61
	L/180	56	53	64	61
8WAB	L/360	40	24	48	45
	L/240	55	38	63	60
	L/180	55	52	63	60
10	L/360	27	16	35	23
	L/240	43	27	51	48
	L/180	44	37	52	49
12	L/360	18	11	26	23
	L/240	29	19	37	34
	L/180	36	27	44	41
14	L/360	12	-	20	17
	L/240	21	14	29	26
	L/180	28	20	36	33
16	L/360	-	-	16	13
	L/240	14	10	22	19
	L/180	20	14	28	25

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

<sup>1</sup> Tabulated values are for uniform loads simply supported with zero bearing on facing at supports with top and bottom plates inserted in accordance with Section 4.2.3. Where nonuniform loads are applied to the panels, additional engineering analysis must be submitted by registered design professional. Tabulated values for permanent loading include a creep factor.

<sup>2</sup> Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

<sup>3</sup> Tabulated values are for panels constructed with the OSB strength axis oriented parallel to span direction. Tabulated values for 8 foot long weak axis bearing (WAB) are applicable to SIPs installed with the strong axis of the OSB facings perpendicular the SIP length.

<sup>4</sup> Panel self-weight dead load are included in the load combinations. Additional dead loads must also be included in the load combinations.

<sup>5</sup> Where core splices are incorporated into the panels, splices shall be located such that the applied shear load at the splice does not exceed 235 lbs per foot of width. Core splices greater than nine inches from the panel end will not be controlled by core splice shear load.

<sup>6</sup> Where maintenance worker roof live load of 300 lbf. is required under the IBC, the allowable spans must be determined by registered design professional.

**TABLE 3—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD FOR 6½-INCH-THICK PANELS (1.5-INCH-WIDE BEARING CONDITION) <sup>1,2,3,4,5,6</sup>**

PANEL LENGTH OR SPAN (feet)	DEFLECTION LIMIT <sup>2</sup>	ALLOWABLE UNIFORM LOAD (psf)			
		LOAD TYPE			
		Roof/Floor Live Load plus Downward Wind Load	Roof Snow Load plus Downward Wind Load	Roof Wind Uplift Load	Wall Wind Load (positive and negative)
8	L/360	42	25	75	72
	L/240	65	39	73	70
	L/180	67	54	50	47
10	L/360	28	17	36	33
	L/240	44	28	51	49
	L/180	53	38	61	58
12	L/360	19	11	27	24
	L/240	31	20	39	36
	L/180	43	28	51	48
14	L/360	13	-	21	18
	L/240	21	14	29	26
	L/180	30	21	38	35
16	L/360	-	-	16	13
	L/240	15	10	23	20
	L/180	22	15	30	27

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

<sup>1</sup> Tabulated values are for uniform loads simply supported with minimum 1.5-inch-wide continuous bearing support at each end. Where nonuniform loads are applied to the panels, additional engineering analysis must be submitted by registered design professional. Tabulated values for permanent loading include a creep factor.

<sup>2</sup> Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

<sup>3</sup> Tabulated values are for panels constructed with the OSB strength axis oriented parallel to span direction.

<sup>4</sup> Panel self-weight dead load are included in the load combinations. Additional dead loads must also be included in the load combinations.

<sup>5</sup> Where core splices are incorporated into the panels, splices shall be located such that the applied shear load at the splice does not exceed 235 lbs per foot of width. Core splices greater than 9 inches from the panel end will not be controlled by core splice shear load.

<sup>6</sup> Where maintenance worker roof live load of 300 lbf. is required under the IBC, the allowable spans must be determined by registered design professional.

**TABLE 4—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD FOR 8<sup>1</sup>/<sub>4</sub>-INCH-THICK PANELS (1.5-INCH-WIDE BEARING CONDITION)<sup>1,2,3,4,5,6</sup>**

PANEL LENGTH OR SPAN (feet)	DEFLECTION LIMIT <sup>2</sup>	ALLOWABLE UNIFORM LOAD (psf)			
		LOAD TYPE			
		Roof/Floor Live Load plus Downward Wind Load	Roof Snow Load plus Downward Wind Load	Roof Wind Uplift Load	Wall Wind Load (positive and negative)
8	L/360	52	30	60	57
	L/240	80	47	88	85
	L/180	80	65	88	85
10	L/360	37	21	45	42
	L/240	58	35	66	63
	L/180	63	48	71	68
12	L/360	27	16	35	32
	L/240	42	26	50	47
	L/180	51	36	59	56
14	L/360	19	11	27	24
	L/240	32	20	40	37
	L/180	36	28	44	41
16	L/360	14	-	22	19
	L/240	24	15	32	29
	L/180	26	22	34	31

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

<sup>1</sup> Tabulated values are for uniform loads simply supported with minimum 1.5-inch-wide continuous bearing support at each end. Where nonuniform loads are applied to the panels, additional engineering analysis must be submitted by registered design professional. Tabulated values for permanent loading include a creep factor.

<sup>2</sup> Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

<sup>3</sup> Tabulated values are for panels constructed with the OSB strength axis oriented parallel to span direction.

<sup>4</sup> Panel self-weight dead load are included in the load combinations. Additional dead loads must also be included in the load combinations.

<sup>5</sup> Where core splices are incorporated into the panels, splices shall be located such that the applied shear load at the splice does not exceed 236 lbs per foot of width. Core splices greater than 24 inches from the panel end will not be controlled by core splice shear load.

<sup>6</sup> Where maintenance worker roof live load of 300 lbf. is required under the IBC, the allowable spans must be determined by registered design professional.

**TABLE 5—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD FOR 10<sup>1</sup>/<sub>4</sub>-INCH-THICK PANELS (1.5-INCH-WIDE BEARING CONDITION)** <sup>1,2,3,4,5,6</sup>

PANEL LENGTH OR SPAN (feet)	DEFLECTION LIMIT <sup>2</sup>	ALLOWABLE UNIFORM LOAD (psf)			
		LOAD TYPE			
		Roof/Floor Live Load plus Downward Wind Load	Roof Snow Load plus Downward Wind Load	Roof Wind Uplift Load	Wall Wind Load (positive and negative)
8	L/360	61	34	69	66
	L/240	83	54	91	88
	L/180	83	74	91	88
10	L/360	45	25	53	50
	L/240	65	41	73	70
	L/180	65	56	73	70
12	L/360	34	19	42	39
	L/240	53	31	61	58
	L/180	54	44	62	59
14	L/360	26	15	42	46
	L/240	41	25	49	46
	L/180	41	35	49	31
16	L/360	20	11	28	25
	L/240	31	20	39	36
	L/180	31	28	39	36
18	L/360	15	-	31	20
	L/240	23	16	31	28
	L/180	23	23	23	28

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

<sup>1</sup> Tabulated values are for uniform loads simply supported with minimum 1.5-inch-wide continuous bearing support at each end. Where nonuniform loads are applied to the panels, additional engineering analysis must be submitted by registered design professional. Tabulated values for permanent loading include a creep factor.

<sup>2</sup> Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

<sup>3</sup> Tabulated values are for panels constructed with the OSB strength axis oriented parallel to span direction.

<sup>4</sup> Panel self-weight dead load are included in the load combinations. Additional dead loads must also be included in the load combinations.

<sup>5</sup> Where core splices are incorporated into the panels, splices shall be located such that the applied shear load at the splice does not exceed 260 lbs per foot of width. Core splices greater than 24 inches from the panel end will not be controlled by core splice shear load.

<sup>6</sup> Where maintenance worker roof live load of 300 lbf. is required under the IBC, the allowable spans must be determined by registered design professional.



**TABLE 6—MAXIMUM ALLOWABLE UNIFORM TRANSVERSE LOAD FOR 12<sup>1</sup>/<sub>4</sub>-INCH-THICK PANELS (1.5-INCH-WIDE BEARING CONDITION)<sup>1,2,3,4,5,6</sup>**

PANEL LENGTH OR SPAN (feet)	DEFLECTION LIMIT <sup>2</sup>	ALLOWABLE UNIFORM LOAD (psf)			
		LOAD TYPE			
		Roof/Floor Live Load plus Downward Wind Load	Roof Snow Load plus Downward Wind Load	Roof Wind Uplift Load	Wall Wind Load (positive and negative)
8	L/360	63	35	71	68
	L/240	78	54	86	83
	L/180	78	74	86	83
10	L/360	48	26	56	53
	L/240	61	42	69	66
	L/180	61	57	69	66
12	L/360	38	20	46	43
	L/240	50	33	58	55
	L/180	50	46	58	55
14	L/360	30	16	38	35
	L/240	42	27	50	47
	L/180	42	38	50	47
16	L/360	24	13	32	29
	L/240	36	22	44	41
	L/180	36	31	44	41
18	L/360	20	11	28	25
	L/240	28	18	36	33
	L/180	28	26	36	33
20	L/360	16	-	24	21
	L/240	22	15	30	27
	L/180	22	022	30	27

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

<sup>1</sup> Tabulated values are for uniform loads simply supported with minimum 1.5-inch-wide continuous bearing support at each end. Where nonuniform loads are applied to the panels, additional engineering analysis must be submitted by registered design professional. Tabulated values for permanent loading include a creep factor.

<sup>2</sup> Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of applicable building code.

<sup>3</sup> Tabulated values are for panels constructed with the OSB strength axis oriented parallel to span direction.

<sup>4</sup> Panel self-weight dead load are included in the load combinations. Additional dead loads must also be included in the load combinations.

<sup>5</sup> Where core splices are incorporated into the panels, splices shall be located such that the applied shear load at the splice does not exceed 283 lbs per foot of width. Core splices greater than 21 inches from the panel end will not be controlled by core splice shear load.

<sup>6</sup> Where maintenance worker roof live load of 300 lbf. Is required under the IBC, the allowable spans must be determined by registered design professional.

**TABLE 7—MAXIMUM ALLOWABLE UNIFORM AXIAL LOAD FOR SANDWICH PANELS 4<sup>1</sup>/<sub>2</sub>-INCH THROUGH 12<sup>1</sup>/<sub>4</sub>-INCH THICK (plf)<sup>1,2,3</sup>**

MINIMUM PANEL THICKNESS (inch)	MAXIMUM PANEL HEIGHT (feet)	ALLOWABLE UNIFORM AXIAL LOAD (plf)
4.5	8	3,166
	12	2,771
	16	1,874

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

<sup>1</sup> Tabulated load values are for axial load applied uniformly. Concentrated axial loads are outside the scope of this report and must be supported by other structural element.

<sup>2</sup> Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

<sup>3</sup> Axial load must be applied to both facings bearing on structural supports at the top and bottom of the panel as indicated in Section 4.2.3 of this report.

**TABLE 8—ALLOWABLE IN-PLANE RACKING SHEAR STRENGTH FOR SANDWICH PANELS USED AS SHEAR WALLS 4<sup>1</sup>/<sub>2</sub>-INCH THROUGH 12<sup>1</sup>/<sub>4</sub>-INCH THICK WIND AND SEISMIC LOADS IN SEISMIC DESIGN CATEGORIES A, B AND C**

WALL PANEL WIDTH (feet)	WALL PANEL HEIGHT (feet)	SPLINE TYPE	CHORD/PLATE AND SPLINE CONNECTION DETAILS TO SANDWICH PANELS <sup>3,4,5</sup>			ALLOWABLE SHEAR LOAD (plf)
			Chord	Plate	Spline	
4	8	N/R	Double stud (See Figure 2 for fastening details)	Double top plate/ single bottom plate with cap and sill plate (See Figure 2, 5 and 6 for fastening details)	--	900 <sup>1,6,7</sup>
8	8	Block Spline	Double stud (See Figure 3 for fastening details)	Double top plate/ single bottom plate with cap and sill plate (See Figures 3, 5 and 6 for fastening details)	Block Spline (See Figures 2 and 4 for fastening details)	867 <sup>2,6,7</sup>

For SI: 1 inch = 25.4 mm; 1 plf = 14.6 N/m. N/R- not required.

<sup>1</sup> Shear strength value, 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.

<sup>2</sup> Shear strength value, as published in this table, are limited to assemblies resisting wind or seismic forces when the aspect ratio (height:width) does not exceed 1:1.

<sup>3</sup> Chords, plates and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice. Each end of the shear wall must include holddown device capable of resisting overturning force as determined by registered design professional having a minimum allowable stiffness of 35,000 lbs/inch.

<sup>4</sup> Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.

<sup>5</sup> 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.

<sup>6</sup> The panels shall be oriented with the OSB strong axis vertically. The wall panel must be installed in a manner such that both facings of the wall panels are equally and uniformly restrained at the top and bottom of the panels.

<sup>7</sup> Net horizontal deflection at allowable shear load is 0.5-inch.

**TABLE 9—ALLOWABLE IN-PLANE RACKING SHEAR STRENGTH FOR SHEAR WALLS 4<sup>1</sup>/<sub>2</sub> INCH THROUGH 12<sup>1</sup>/<sub>4</sub> INCH THICKNESS WIND AND SEISMIC LOADS IN SEISMIC DESIGN CATEGORIES A, B, C, D, E AND F<sup>1,5,7</sup>**

WALL PANEL WIDTH (feet)	WALL PANEL HEIGHT (feet)	SPLINE TYPE <sup>3</sup>	CHORD, PLATE AND SPLINE CONNECTION DETAILS TO SANDWICH PANELS <sup>2,3,4</sup>			ALLOWABLE SHEAR LOAD <sup>6</sup> (plf)
			Chord	Plate	Spline	
8	8	Double Lumber Splines	Double stud stitched together with two rows of 0.131-inch by 3 inch-long nails at 12 inches on center and fastened to SIP facers with one row of 0.113-inch by 2½-inch long nails at 3 inches on center	Single top plate/ Double bottom plate with cap and sill plate (See Figure 8 for fastening details)	Double Lumber Splines (See Figure 7 for fastening details)	377

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

<sup>1</sup> Shear strength value, as published in this table, are limited to assemblies resisting wind or seismic forces when the aspect ratio (height:width) does not exceed 1:1.

<sup>2</sup> Chords, plates and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice. Each end of the shear wall must include holddown device capable of resisting overturning force as determined by registered design professional having a minimum allowable stiffness of 35,000 lbs/inch.

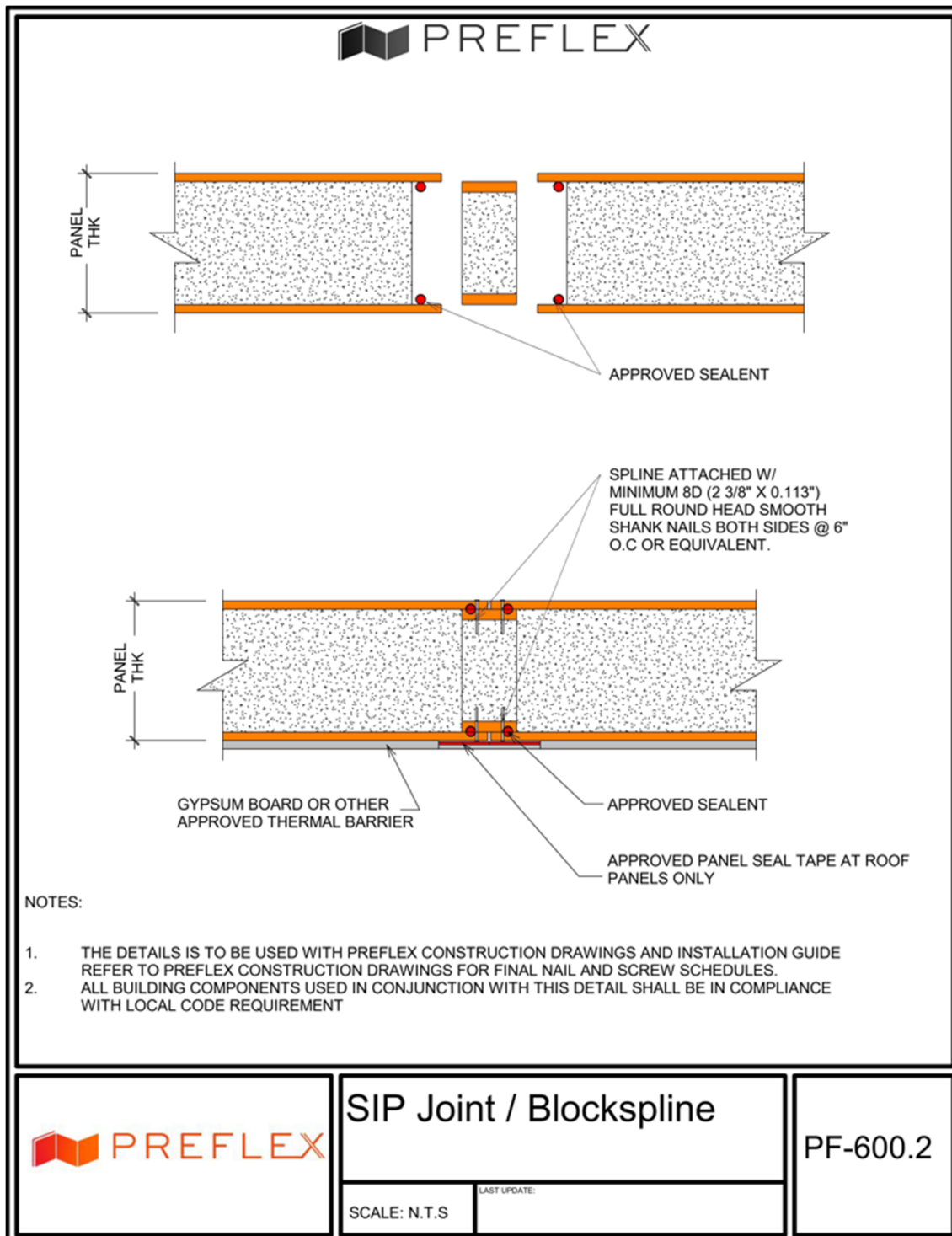
<sup>3</sup> Spline at interior panel-to-panel joints only. The ends of the panels (chords) must include two (2) 2-by dimensional lumber, solid chord members are required at each end of each shear wall segment.

<sup>4</sup> 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.

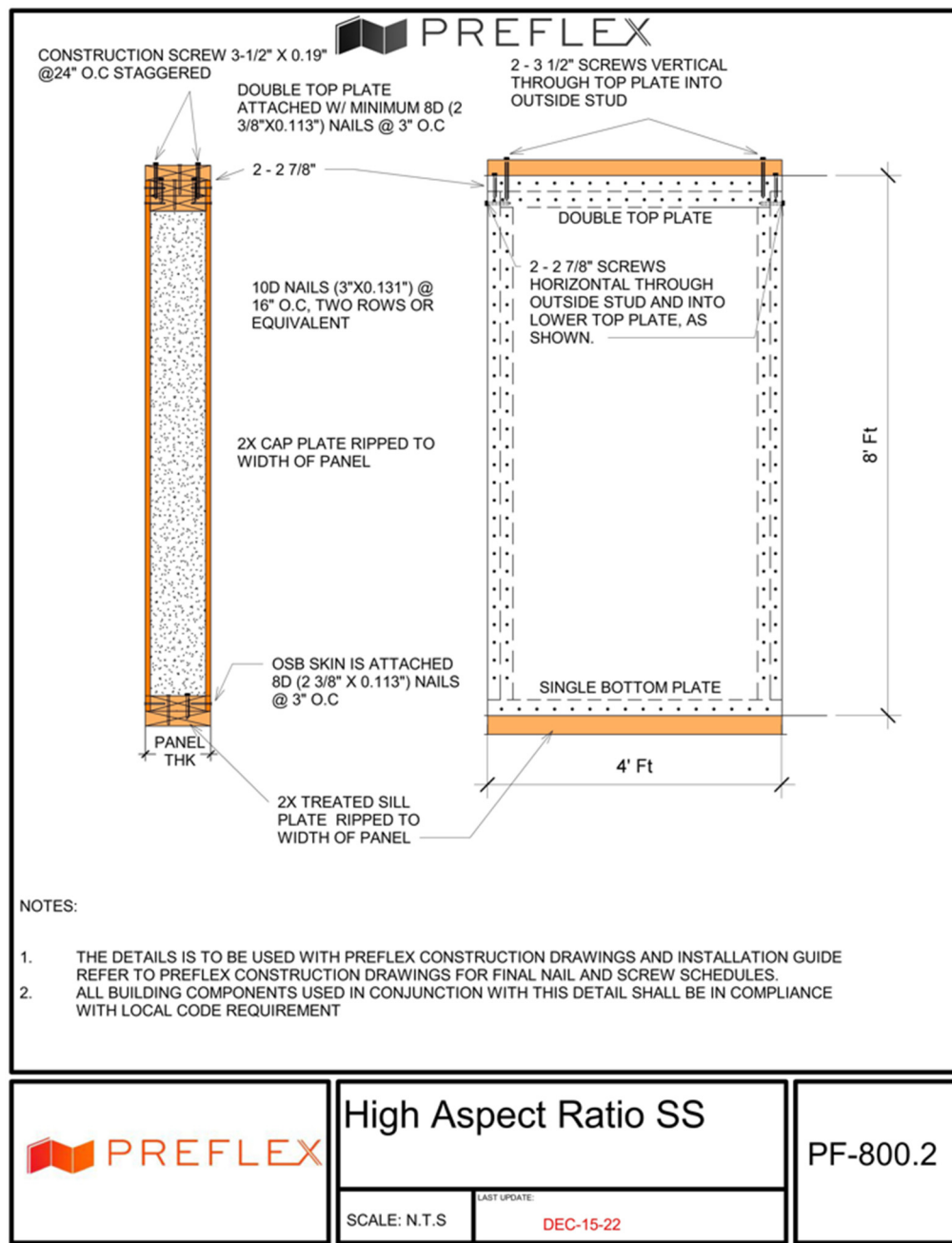
<sup>5</sup> The panels shall be oriented with the OSB strong axis vertically. The wall panel must be installed in a manner such that both facings of the wall panels are equally and uniformly restrained at the top and bottom of the panels.

<sup>6</sup> Net horizontal deflection at allowable shear load is 0.39-inch.

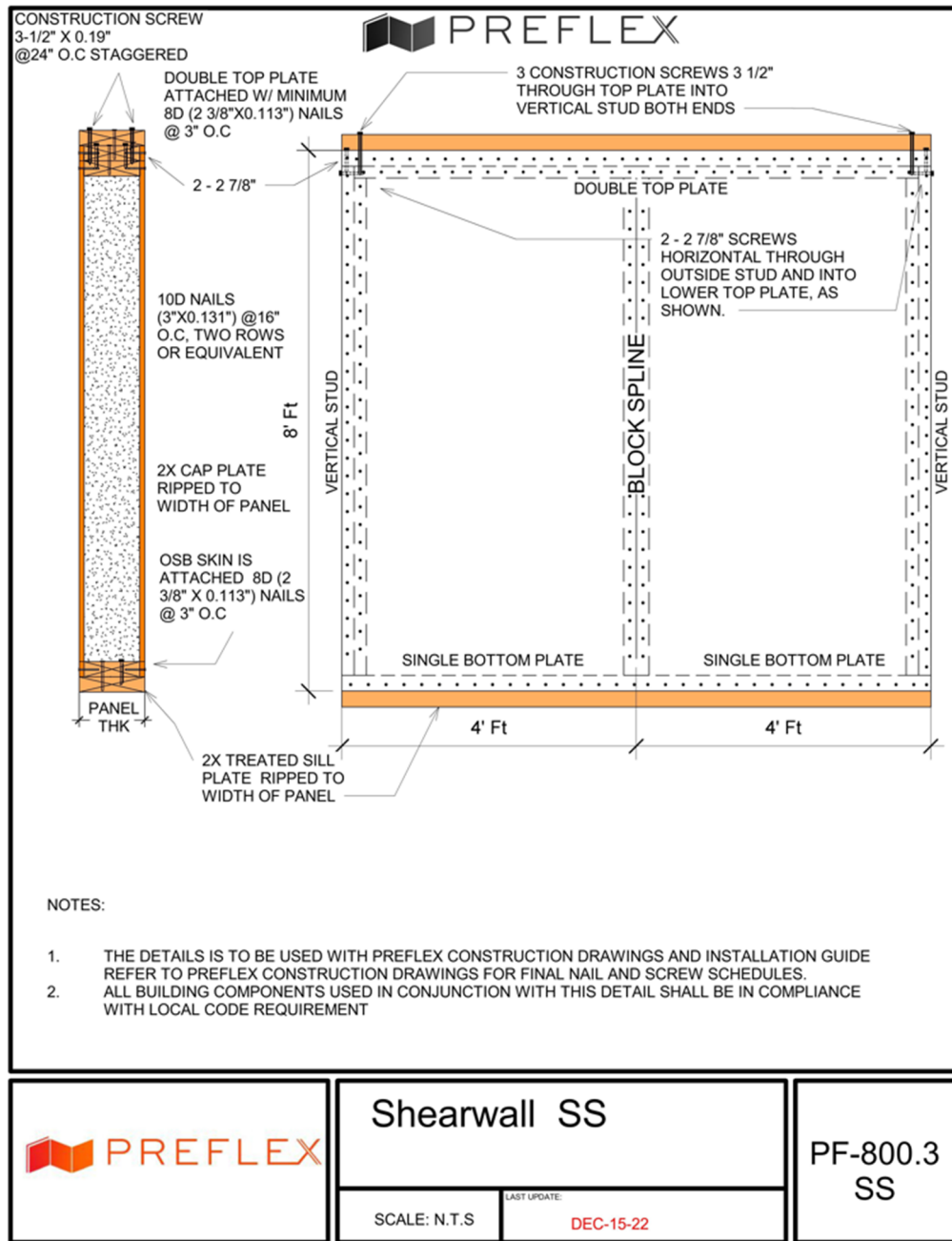
<sup>7</sup> SIP shear walls must be nonload-bearing and the axial must be supported by other structural elements.




**FIGURE 1—TYPICAL BLOCK SPLINE PANEL-TO-PANEL CONNECTION**

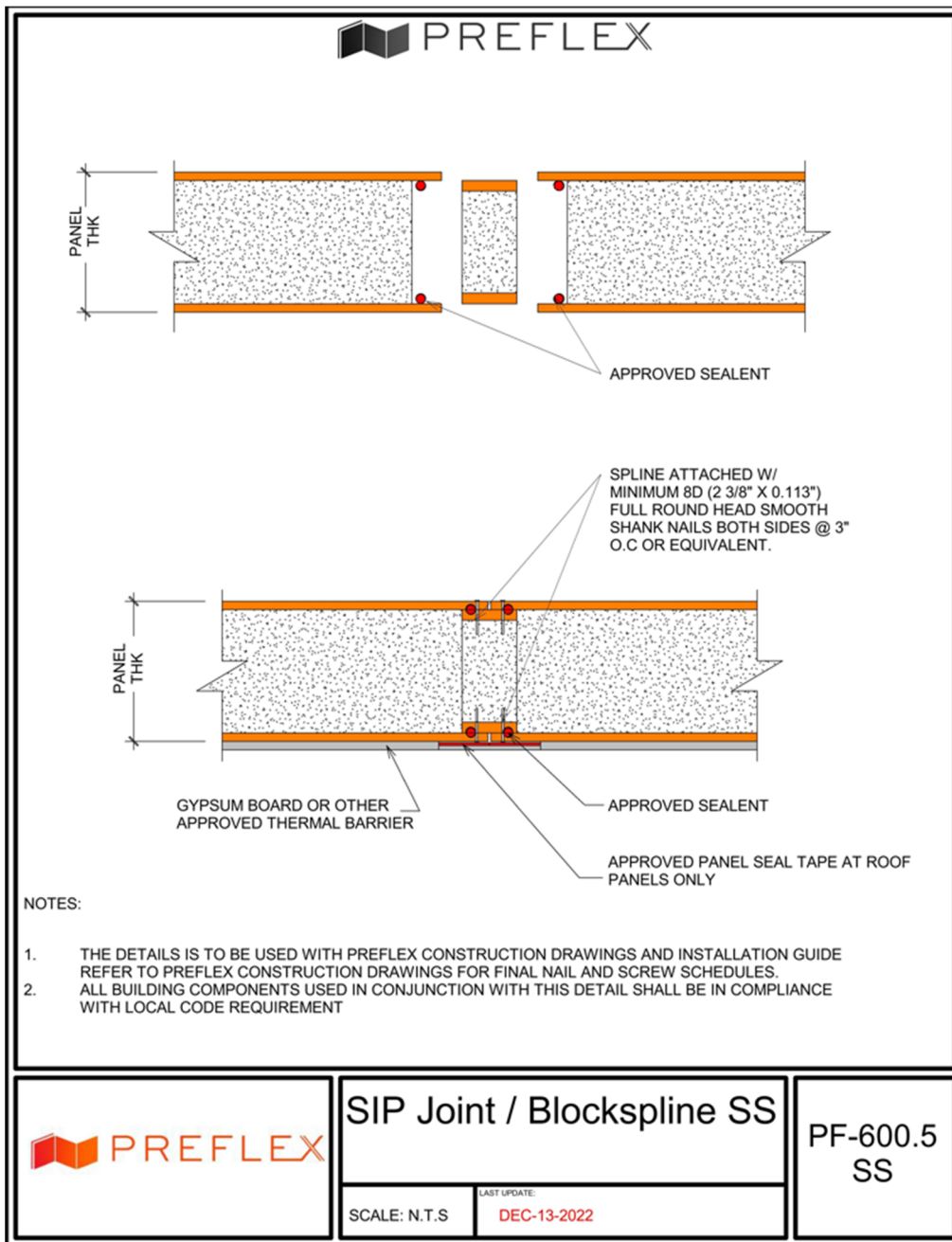


**FIGURE 2—SHEAR WALL ASPECT RATIO 2:1 (SEISMIC DESIGN CATEGORY A, B AND C)**



	<h2>Shearwall SS</h2>	<h2>PF-800.3 SS</h2>
	SCALE: N.T.S	

**FIGURE 3—SHEAR WALL ASPECT RATIO 1:1 (SEISMIC DESIGN CATEGORY A, B AND C)**



**FIGURE 4—SHEAR WALL BLOCK SPLINE FASTENING DETAIL (SEISMIC DESIGN CATEGORY A, B AND C)**

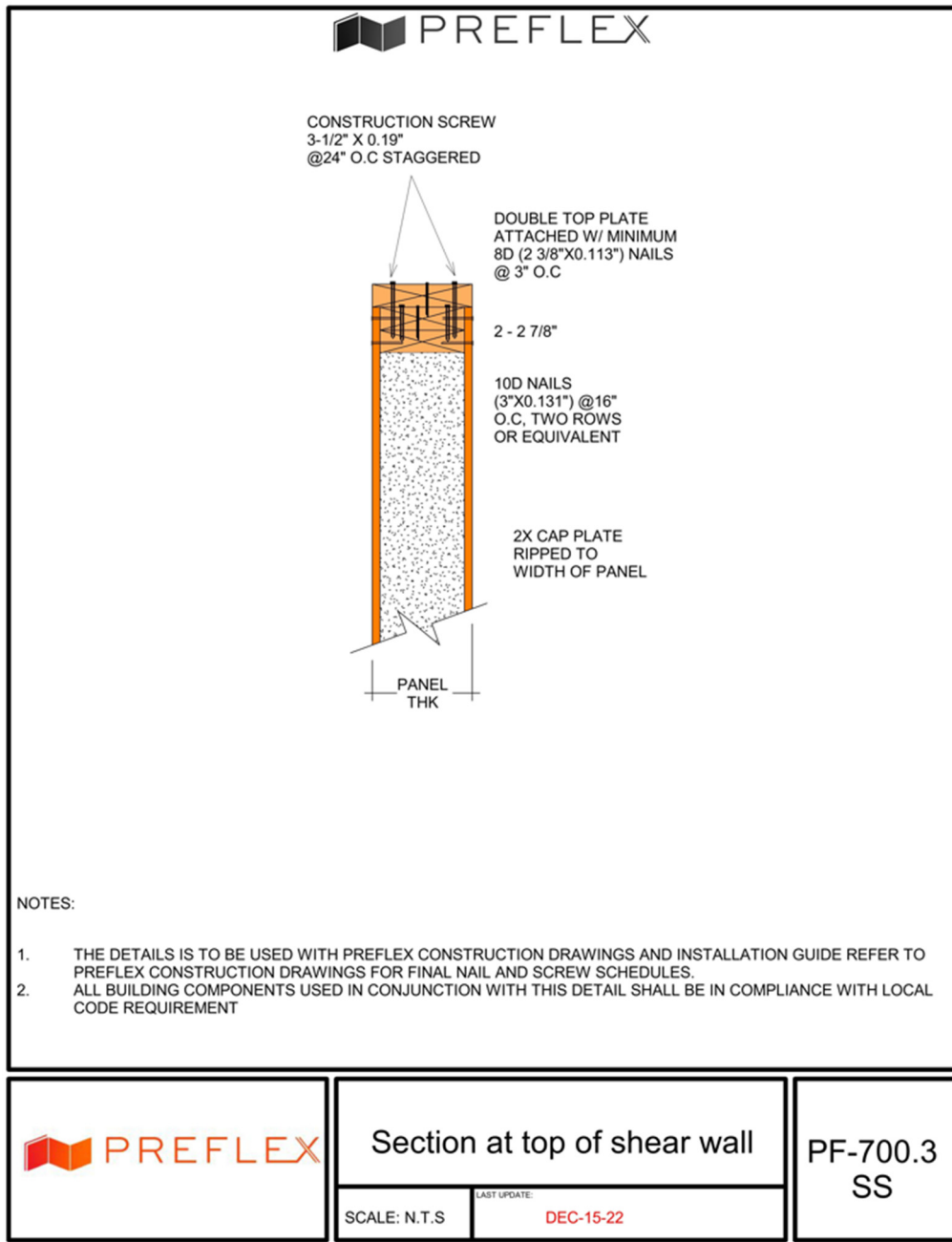


FIGURE 5—SHEAR WALL DOUBLE TOP PLATE FASTENING DETAIL (SEISMIC DESIGN CATEGORY A, B AND C)



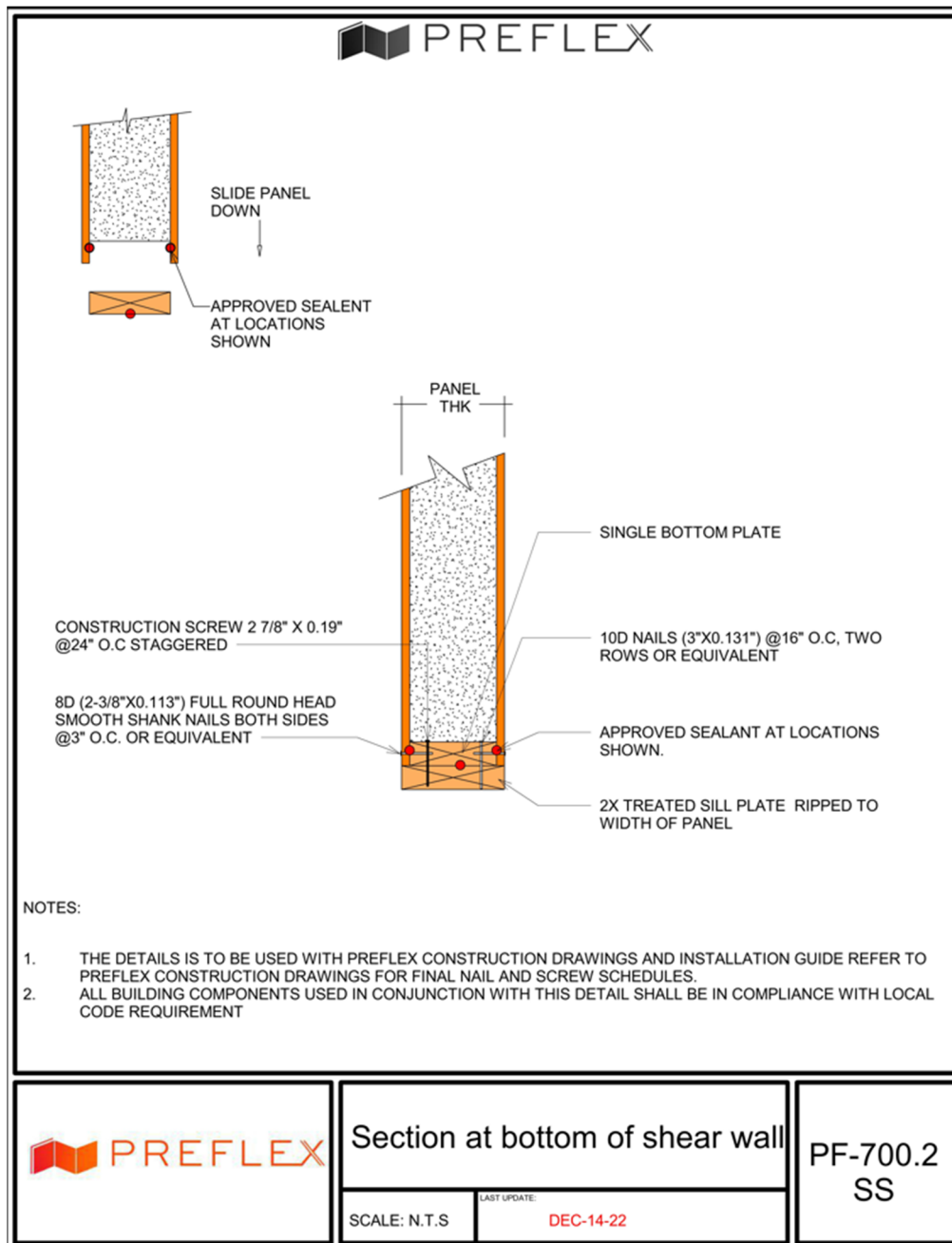
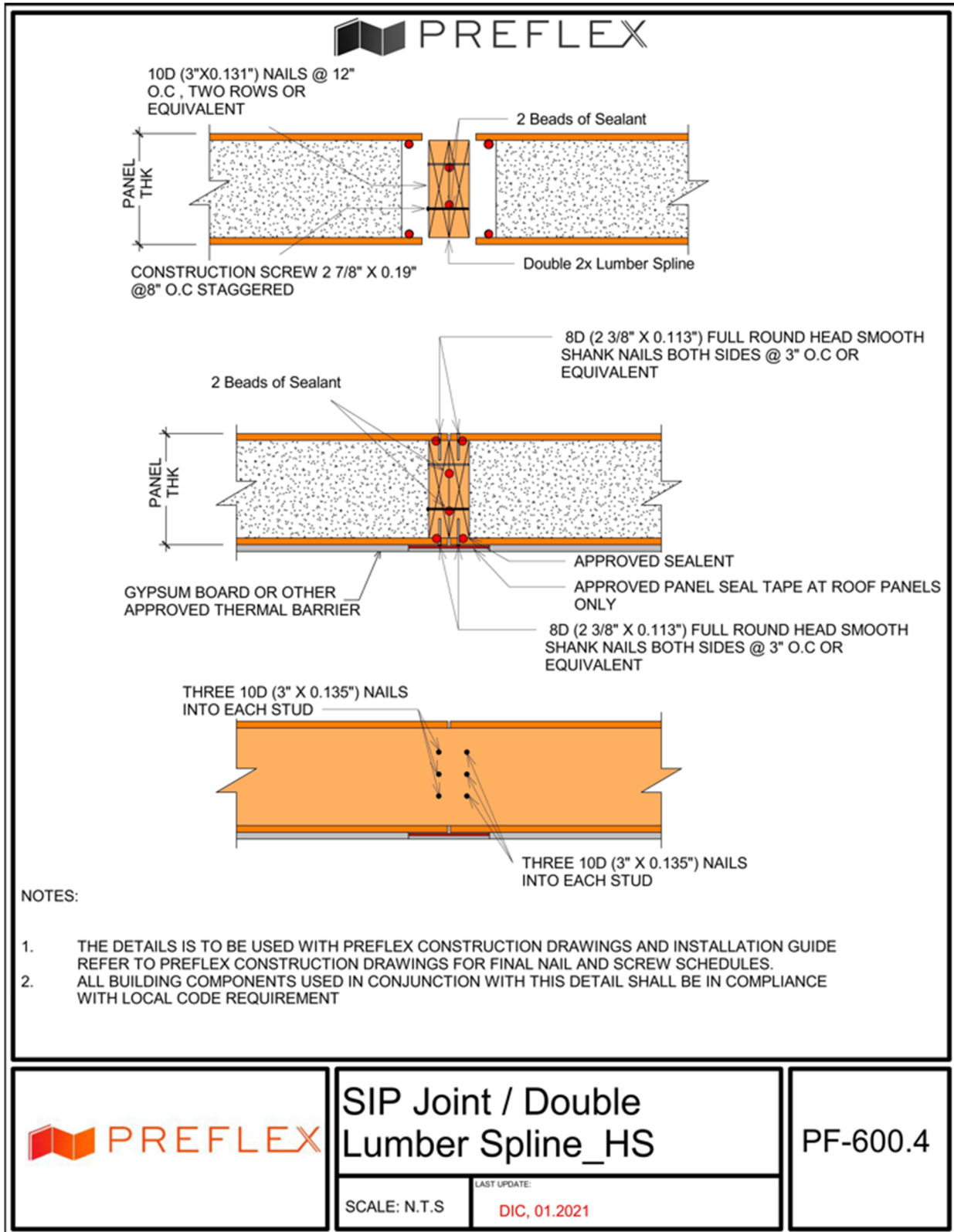
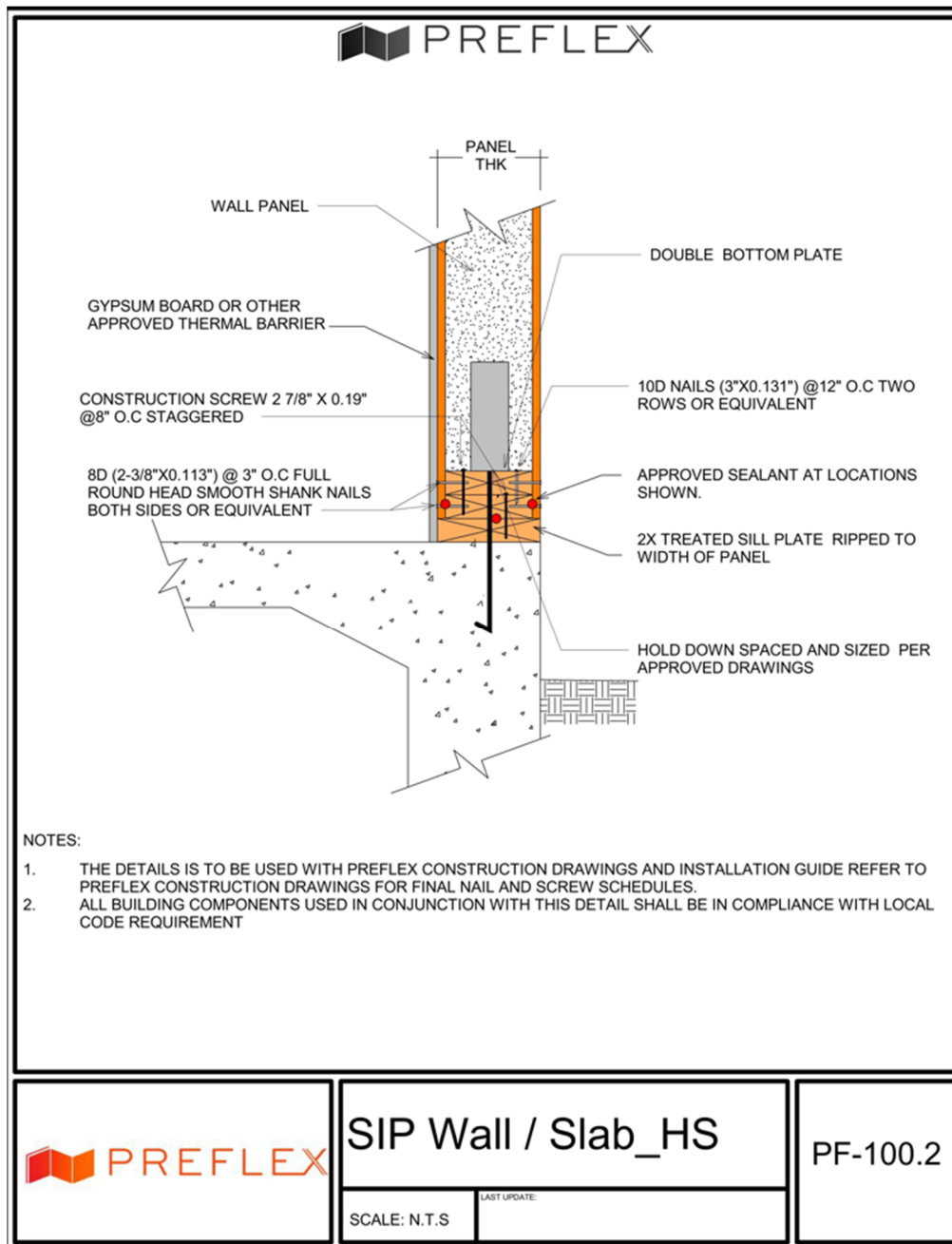


FIGURE 6—SHEAR WALL SINGLE BOTTOM PLATE FASTENING DETAIL (SEISMIC DESIGN CATEGORY A, B AND C)



**FIGURE 7 –SHEAR WALL SPLINE FASTENING DETAIL (SEISMIC DESIGN CATEGORY A, B, C, D, E AND F)**



**FIGURE 8—SHEARWALL BOTTOM PLATE FASTENING DETAIL (SEISMIC DESIGN CATEGORY A, B, C, D, E AND F)**

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

**REPORT HOLDER:**

PREFLEX

**EVALUATION SUBJECT:**

STRUCTURAL INSULATED PANELS

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the Structural Insulated Panels, described in ICC-ES evaluation report [ESR-5318](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

**Applicable code editions:**

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

**2.0 CONCLUSIONS**

The Structural Insulated Panels, described in Sections 2.0 through 7.0 of the evaluation report [ESR-5318](#), comply with the LABC Chapter 23 and 26 and the LARC, and are subject to the conditions of use described in this supplement.

**3.0 CONDITIONS OF USE**

The Structural Insulated Panels described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-5318](#).
- The design, installation, conditions of use and identification of the Structural Insulated Panels are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-5318](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report issued August 2023.

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

**REPORT HOLDER:**

PREFLEX

**EVALUATION SUBJECT:**

STRUCTURAL INSULATED PANELS (SIPS)

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Structural Insulated Panels, described in ICC-ES evaluation report ESR-5318, have also been evaluated for compliance with the codes noted below.

**Applicable code edition(s):**

- 2022 California Building Code (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 California Residential Code (CRC)

**2.0 CONCLUSIONS****2.1 CBC:**

The Structural Insulated Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-5318, comply with CBC Chapters 23 and 26, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16 and 17, as applicable.

**2.1.1 OSHPD:**

The Structural Insulated Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-5318, comply with CBC amended Chapters 23 and 26, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements in Sections 2.1.1.1 and 2.1.1.2 of this supplement:

**2.1.1.1 Conditions of Use**

1. All loads applied shall be determined by the registered design professional and shall comply with applicable loads and load combinations from CBC Chapter 16 and amendments [OSHPD 1R, 2, 3 and 5] and 16A [OSHPD 1 and 4].
1. Fastener used for attachment of exterior wall covering shall comply with CBC Section 2304.10.2 [OSHPD 1, 1R, 2B, 4 & 5].
2. Applicable provisions in CBC Section 2301.1.4 [OSHPD 1, 1R, 2, 4 & 5].
3. Seismic Design Category shall be in accordance with CBC amended Section 1613.1 Exception 6 [OSHPD 1R, 2 and 5].

**2.1.1.2 Special Inspection Requirements:** Special inspection of seismic resistance are required in accordance with CBC amended Section 1705A.1.1 [OSHPD 1 and 4].

**2.1.2 DSA:**

The Structural Insulated Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-5318, comply with CBC amended Chapters 23 and 26, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements in Sections 2.1.2.1 and 2.1.2.2 of this supplement:

**2.1.1.3 Conditions of Use:**

1. All loads applied shall be determined by the registered design professional and shall comply with applicable loads and load combinations from CBC Chapter 16 and amendments [DSA-SS/CC] and 16A [DSA/SS].
2. Fastener used for attachment of exterior wall covering shall comply with CBC 2304.10.2 [DSA-SS].
3. Applicable provisions in CBC Section 2301.1.4 [DSA-SS & DSA-SS/CC].
4. Seismic Design Category shall be in accordance with CBC amended Section 1613.1 Exception 6 [DSA-SS and DSA-SS/CC].

**2.1.1.4 Special Inspection Requirements:** Special inspection of seismic resistance are required in accordance with CBC amended Section 1705A.1.1 [DSA-SS and DSA-SS/CC].

**2.2 CRC:**

The Structural Insulated Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-5318, comply with CRC Chapter 3, provided the design and installation are in accordance with the 2021 *International Building Code*<sup>®</sup> (IBC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report, issued August 2023.