ICC-ES Evaluation Report

ESR-5159

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Subject to renewal April 2026

DIVISION: 06 00 00—WOOD, PLASTIC AND COMPOSITES **Section: 06 12 00—Structural Panels**	**REPORT HOLDER:** **ECOPAN CORPORATION** **ADDITIONAL LISTEES:** **PANELCORE LLC**	**EVALUATION SUBJECT:** **ECOPAN SIPS**	

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2024 and 2021 *International Building Code®* (IBC)
- 2024 and 2021 *International Residential Code®* (IRC)

Main references of this report are for the 2024 IBC and IRC. See Table 7 for applicable sections of the code for previous IBC and IRC editions.

Property evaluated:

- Structural

1.2 Evaluation to the following green code(s) and/or standards:

- 2022 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2020, 2015, 2012 and 2008 ICC 700 National Green Building Standards™ (ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

See Section 3.1

2.0 USES

Ecopan SIP's consists of structural insulated roof and floor panels (10 1/4 inch (260 mm) and 12 1/4 inch (311 mm) thickness), and load-bearing or non-load-bearing wall panels (6 1/2 inch (165 mm) thickness) for Type V-B construction. The panels are alternatives to walls, floors and roofs designed in accordance with IBC Section 2306.

When panels are installed under the IRC, an engineered design is required in accordance with IRC Section R301.1.3. Use of the panels under IRC Section R610 is outside the scope of this evaluation report.

3.0 DESCRIPTION

3.1 General:

Ecopan Structural Insulating Panels are factory-assembled, laminated sandwich panels produced at locations listed in Table 1 of this report. The panels consist of expanded polystyrene (EPS) foam plastic cores with wood-based structural-use OSB facings.

The attributes of the panels have been verified as conforming to the provisions of (i) CALGreen Section A4.403.3.3; (ii) ICC 700-2020, ICC 700-2015 and ICC 700-2012 Sections 601.5 and 11.601.5; and (iii) ICC 700-2008 Section 601.5 for prefabricated strucutrual components. Note that decisions on complieance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.2 Material:

3.2.1 Expanded Polystyrene: The core material is EPS Foam conforming to the Type I specification defined in ASTM C578. The foam core, from 5 $^{3}/_{8}$ in. up to 11-$^{3}/_{8}$ in. thickness, has a flame spread rating not exceeding 75 and a smoke-developed rating not exceeding 450 when tested in accordance with ASTM E84.

3.2.2 Facing: Panel facing material is a minimum $^{7}/_{16}$-inch-thick (11.1 mm), Exposure 1 oriented strand board (OSB) with a span rating of 24/16, and complying with DOC PS2. The OSB facings are continuous for each SIP. The facing may be oriented in the weak or strong axis.

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

3.2.4 Splines: There are two types of splines: OSB surface or double dimensional OSB. OSB surface splines are 4-inch-wide-by-7/16-inch-thick (102 by 11.1 mm) OSB, as described in Section 3.2.2, that are installed into recesses in the panel core, along the longitudinal edges of the panels, behind the panel facers on both faces of the panels. The double dimensional OSB splines are two (2) nominal 2-by dimensional lumber member stitched together, 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 Table 2 through Table 5. 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 splines as described in 4.2.2 shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 5. 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 5, are limited to assemblies with height-to-width ratios not exceeding those published in Table 5 footnotes.

4.1.4.1 Seismic Design Categories A, B and C (IBC and IRC): The use of the shear wall configuration in Table 5 is limited to structures in Seismic Design Categories A, B and C.

4.1.4.2 Concentrated live Load for Floor Applications: The Ecopan SIP's floor panels meet the 2,000 lbf (8.9 kN) concentrated live load defined in IBC Section 1607.4 and IBC Table 1607.1. See Table 6 for midspan deflection information.

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: The panels must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of the installation instructions must be available at all times on the jobsite during installation. Panel locations must comply with the report and the plans and specifications approved by the code official.

The wall panels used as bearing walls must be installed in the manner described in the footnotes in Table 2 through Table 5. When used as shear walls, the wall panels must be installed in accordance with Table 5.

Unless noted otherwise in this report, an EPS-compatible sealant is applied along butting EPS core surfaces and any dimensional lumber surfaces, and along the bottom of the panel base plate before panel placement. Typical installation details are shown in Figure 1, 2 and 3. Structural calculations must be prepared to substantiate the details for the specific installation and loading conditions.

4.2.2 Splines: The panels must be connected to each other along their edges with the splines described in Section 3.2.4 of this report, as specified by the applicable tables in this report. Unless noted otherwise in this report, OSB facings of the panels must be attached to the splines with 8d common nails, or equivalent, spaced at a maximum of 6 inches (152 mm) on center.

4.2.3 Plates: The top and bottom plates of the panels shall be 2-by dimensional SPF lumber sized to match the core thickness of the panel and fastened to both panel facings with 8d common nails, or equivalent, spaced at a maximum of 6 inches (152 mm) on center, unless noted otherwise in this evaluation report.

4.2.4 Thermal Barrier:

4.2.4.1 Wall, Roof and Floor: $^{5}/_{8}$-inch (15.9 mm) Type X Gypsum wallboard complying with ASTM C1396, or equivalent code complying thermal barrier in accordance with IBC Section 2603.4, 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 $1^{1}/_{4}$-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 8-inch-on-center (203 mm) around the perimeter of the sheets and 12-inch-on-center (305 mm) in the field. The gypsum board joints and fastener heads must be taped and mudded in accordance with ASTM C840.

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

4.2.5 Panel Cladding:

4.2.5.1 Roof Covering: The roof covering must comply with Chapter 15 of the IBC, or IRC Section R901, as applicable. Roofs with hot-asphalt or hot-coal tar pitch are prohibited. Underlayment and flashing must be installed in accordance with the applicable code.

4.2.5.2 Exterior Wall Covering: The exterior face of wall panels is required to be covered with a wall covering complying with the applicable code or recognized in a current ICC-ES evaluation report. A water-resistive barrier must be installed over the panels in accordance with 2021 IBC Section 1403.2 or IRC Section R703.2, as applicable, prior to the application of the wall covering. Where Portland cement plaster is used, compliance with IBC Section 2510 and 2512 or IRC Section R703.6.3, as applicable, is necessary.

5.0 CONDITIONS OF USE:

The Ecopan 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 SIPs must be determined in accordance with the IBC or IRC, as applicable, and must not exceed the allowable loads noted in this report.

5.3 All construction documents specifying the building panels described in this report must comply with the design limitations of this report. Design calculations and details for the specific applications must be furnished to the code official verifying compliance with this report and applicable codes. The transfer of vertical loads and lateral loads from the roof or floor diaphragm into the shear wall and from the shear wall to the foundation must be addressed in the calculations. When Ecopan SIP shear walls are used in building that are more than one story tall, calculations and details must be submitted to the code official showing the load path for the transfer of lateral and overturning forces from the upper-story shear walls to the foundation. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 Connection and attachments of the panel are outside the scope of this report and must be addressed in the design calculations and details.

5.5 Ecopan SIP's panels described in this evaluation report are permitted to be used as shear wall assemblies in buildings located in IBC Seismic Design Categories A, B and C. The use of the panels under Seismic Design Categories D through F is allowed when code-complying seismic lateral force resisting system is installed.

5.6 The foam plastic insulation of the panels must be separated from the interior of the building with a thermal barrier, installed in accordance with Section 4.2.2 of this report.

5.7 Use of the panels is limited to Type V-B construction.

5.8 Use of the foam plastic in areas subject to damage from termites must be in accordance with 2024 IBC Section 2603.8 and 2024IRC Section R305.4, as applicable.

5.9 The panels must be installed such that the panel facings are protected against decay and termites in accordance with 2024 IBC Sections 2304.12.1.2 and 2304.12.1.5 or 2024 IRC Sections R304 and R305, as applicable.

5.10 The panels and their attachments must be subject to inspection by the code official prior to covering with an approved water-resistive barrier or roof covering.

5.11 For installations of the roof panels, justification must be submitted to the code official demonstrating that the panels with the roof covering comply as a Class A, B, or C roof assembly, as required by IBC Section 2603.6, with the classification complying with the minimum classification requirements of the building.

5.12 For use of the panels under the IRC, the panels are limited to an engineered design under IRC Section R301.1.3, with engineering performed in accordance with this evaluation report.

5.13 The panels are manufactured by the listee noted in this report, at the location specified in Table 1, under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated June 2019(Editorially revised December 2020), including Appendix A of AC04.

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 (ESR-5159) along with the name, registered trademark, or registered logo of the report holder and/or listee must be included in the product label.

7.2 In addition, the panels are identified by the name and address of the sandwich panel manufacturer (as noted in Table 1 and the product panel number.

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

ECOPAN CORPORATION
52057 TOWNSHIP RD. 283A
ROCKY VIEW COUNTY, ALBERTA, CANADA, T4C 3A1
(403) 277 4000
http://www.sipstech.com
info@sipstech.com

7.4 The additional listee's contact information is the following:

PANELCORE LLC
666 MCKINLEY AVE.
ALPENA, MICHIGAN 49707
+1 (403) 819-1008

TABLE 1—MANUFACTURING LOCATIONS

Ecopan Structural Insulating Panels Plants
Panelcore LLC 666 McKinley Ave. Alpena, MI 49707 +1 (403) 819-1008

TABLE 2—ALLOWABLE UNIFORM TRANSVERSE LOADS FOR WALL PANELS (psf)

THICKNESS (inches)		DEFLECTION LIMITS	PANEL LENGTH OR SPAN (feet)								
Panel	Core		8	10	12	14	16	18	20	22	24
6 1/2 [1]	5 3/8	L/180	*131*	*112*	*90*	*63*	*36*	*30*	*24*	*18*	*12*
		L/240	*113*	*91*	*70*	*48*	*27*	*22*	*18*	*13*	*9*
		L/360	*79*	*64*	*48*	*33*	*18*	*15*	*12*	*9*	*6*
6 1/2 [1,2] WAB	5 3/8	L/180	*117*	-	-	-	-	-	-	-	-
		L/240	*109*	-	-	-	-	-	-	-	-
		L/360	*75*	-	-	-	-	-	-	-	-
6 1/2 [3]	5 3/8	L/180	*76*	*64*	*52*	*41*	*29*	-	-	-	-
		L/240	*76*	*64*	*51*	*37*	*22*	-	-	-	-
		L/360	*56*	*45*	*35*	*25*	*15*	-	-	-	-

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psf = 47.9 Pa.

[1]Tabulated values are for uniform loads simply supported with 3 inch bearing on facing at supports.
[2]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 to the SIP length.
[3]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.

TABLE 3—ALLOWABLE UNIFORM TRANSVERSE LOADS FLOOR/ROOF PANELS (psf)[1,2]

THICKNESS (inches)		DEFLECTION LIMITS	PANEL LENGTH OR SPAN (feet)				
Panel	Core		8	10	12	14	16
10 1/4 [1]	9 3/8	L/180	*135*	*117*	*99*	*81*	*64*
		L/240	*135*	*117*	*99*	*81*	*63*
		L/360	*135*	*117*	*95*	*68*	*42*
12 1/4 [1]	11 3/8	L/180	*172*	*150*	*127*	*104*	*82*
		L/240	*172*	*150*	*127*	*104*	*81*
		L/360	*172*	*150*	*127*	*94*	*55*

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psf = 47.9 Pa.

[1]Tabulated values are for uniform loads simply supported with 3 inch bearing on facing at supports.
[2]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—ALLOWABLE UNIFORM AXIAL LOADS FOR WALL PANELS (plf)1,2

THICKNESS (inches)		WALL PANEL HEIGHT (feet)								
Panel	Core	8	10	12	14	16	18	20	22	24
6 1/2 [1]	5 3/8	3,565	3,222	2,879	2,537	2,194	2,035	1,876	1,716	1,557

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 plf = 14.6 N/m.

[1]Tabulated load values are for axial load applied uniformly. Concentrated axial loads are outside the scope of this report and must be supported by another structural element.
[2]Wall panel facings must be in full bearing at the top and bottom.

TABLE 5—ALLOWABLE LATERAL IN-PLANE RACKING SHEAR LOAD FOR SHEAR WALL ASSEMBLIES JOINED WITH SPLINES FOR WIND AND SEISMIC LOADS IN SEISMIC DESIGN CATEGORIES A, B and C [1,2,3,4]

WALL THICKNESS:	BOTTOM PLATE	TOP PLATE	END POST	SPLINE	FASTENER	FASTENER SPACING	ALLOWABLE LOAD (PLF)
6 1/2	2x6 #3 SPF with 2x8 SPF Sill Plate	2x6 #3 SPF	2x6 #3 SPF	7/16 OSB Face or double dimensional OSB	0.131 x 2 1/2 inch (8d) nails with a 0.285 Diameter head	6 inch on center, 3/4 inch edge distance	393

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psf = 47.9 Pa.

[1]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.
[2]Plates and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.
[3]Splines must be as described in Section 3.2.4 of this report.

[4]A hold-down device must be attached to the vertical end post at each end of the shear wall assembly. Installation of the hold-down devices must be in accordance with the hold-down device manufacturer's instructions and as designed by the registered design professional.

TABLE 6—2,000 LBS CONCENTRATED LIVE LOAD

MINIMUM PANEL THICKNESS (inches)		MAXIMUM PANEL SPAN (feet)	Midspan DEFLECTION AT 2,000 LBS
Panel	Core	16	0.678[1]
10 1/4 [1]	9 3/8		

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psf = 47.9 Pa.

[1]Deflection values are based on concentrated load testing with the load applied at midspan edge uniformly distributed over an area of 2 1/2 foot by 2 1/2 foot as described in IBC Section 1607.4 with simply supported panels with 3 inch bearing width.

TABLE 7—APPLICABLE SECTIONS OF THE IBC CODE UNDER EACH EDITION OF THE IBC AND IRC

2024 IBC	2021 IBC
Section 1607.4	
Table 1607.1	
Section 2603.4	
Chapter 15	
Section 1403.2	
Section 2510 and 2512	
Section 2603.8	
Sections 2304.12.1.2	
Section 2304.12.1.5	
Section 2603.6	

2024 IRC	2021 IRC
Section R301.1.3	
Table R702.3.5	
Section R901	
Section R703.2	
Section R703.6.3	
Section R305	Section R318
Section R304	Section R317

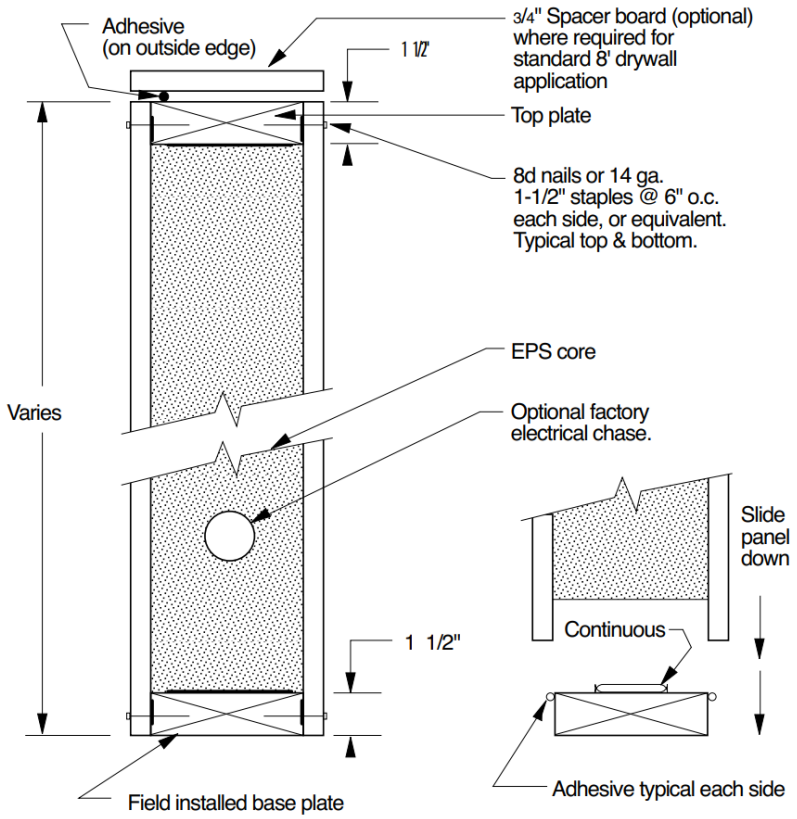

FIGURE 1—TOP AND BASE PLATE CONNECTIONS

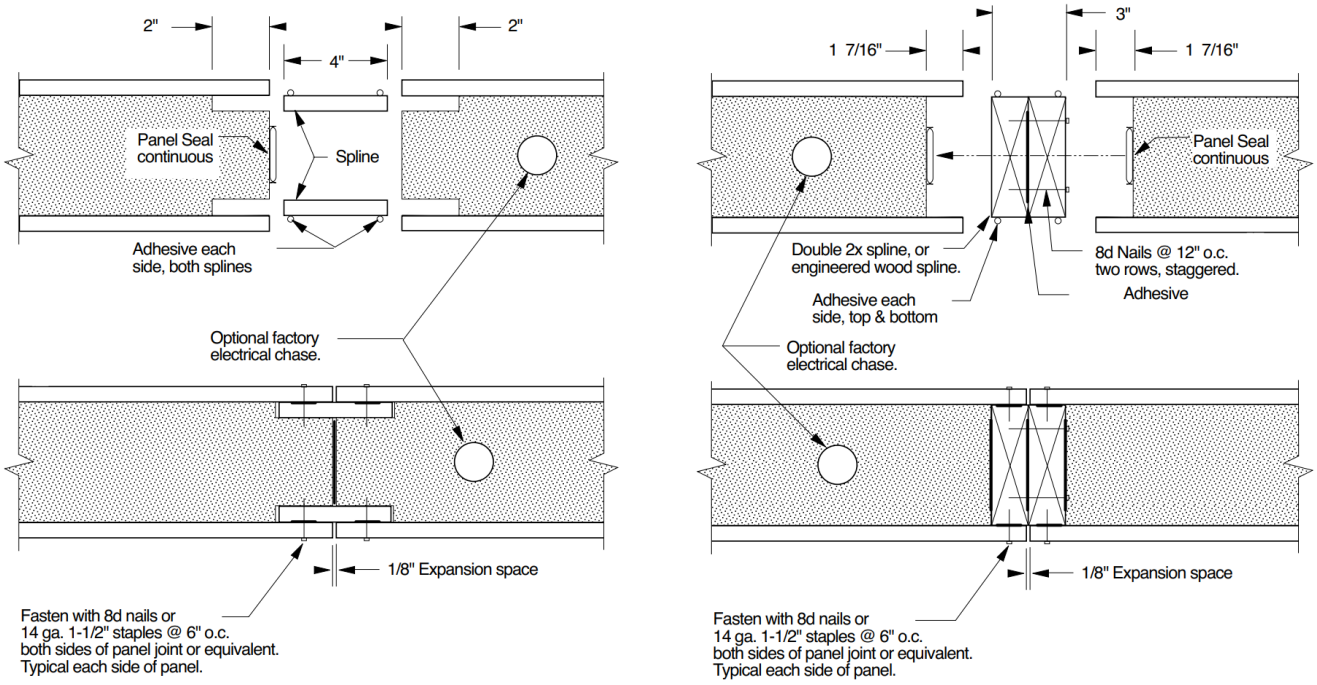

FIGURE 2—SPLINE CONNECTION

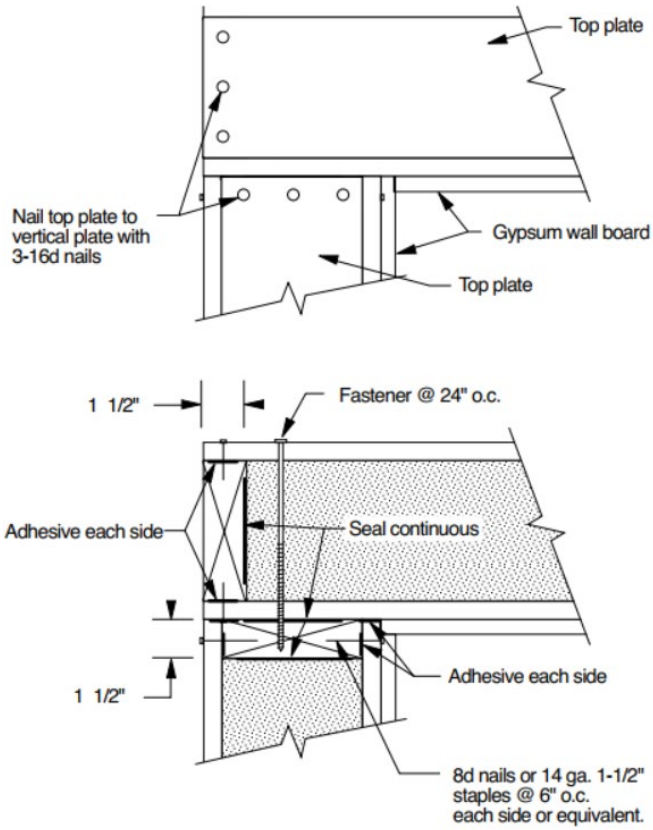

FIGURE 3—CORNER CONNECTION