

ICC-ES Evaluation Report


ESR-4382

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<p>DIVISION: 06 00 00 - WOOD, PLASTICS, AND COMPOSITES</p> <p>Section: 06 12 00—Structural Panels</p>	<p>REPORT HOLDER:</p> <p>MM&I CONSTRUCTION AND DESIGN, INC.</p>	<p>EVALUATION SUBJECT:</p> <p>RENEGADE PANELS 4-13/16 INCH, 6-13/16 INCH, 8-9/16 INCH, 10-9/16 INCH AND 12-9/16 INCH PANEL THICKNESS</p>	
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1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2015, 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2015, 2012, 2009 and 2006 [International Residential Code® \(IRC\)](#)
- 2013 *Abu Dhabi International Building Code (ADIBC)*[†]

[†]The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Structural
- Fire resistance

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

- [2019 California Green Building Standards Code \(CALGreen\)](#), Title 24, Part 11
- [2020, 2015, 2012 and 2008 ICC 700 National Green Building Standard™ \(ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008\)](#)

Properties evaluated:

- See Section 3.1

2.0 USES

The Renegade Panels consists of structural insulated roof and floor panels, and load-bearing or non-load-bearing wall panels for Type V construction. The panels are alternatives to walls, floors and roofs designed in accordance with IBC Section 2306. Panels used in one-hour and two-hour fire-resistance rated assemblies must be installed in accordance with Section 4.2.4.

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 2015 IRC Section R610 or 2012 and 2009 IRC Section R613 is outside the scope of this evaluation report.

3.0 DESCRIPTION

3.1 General:

Renegade panels are factory-assembled, laminated sandwich panels produced at the location listed in Section 5.18 of this report. The panels consist of expanded polystyrene (EPS) foam plastic cores with wood-based structural-use sheathing facings. The panels are available in 4^{13/16}-inch (122.2 mm), 6^{13/16}-inch (173.0 mm), 8^{9/16}-inch (217.5 mm), 10^{9/16}-inch (268.3 mm) and 12^{9/16}-inch (319.1 mm) panel thicknesses, and

are custom made with a maximum panel size of 8 feet (2.44 m) high by 24 feet (7.32 m) long. The panels are manufactured in two configurations as noted in Sections 3.1.1 and 3.1.2.

The attributes of the panels have been verified as conforming to the provisions of (i) CALGreen Section A4.404.3.3 and (ii) ICC 700-2020, ICC 700-15 and ICC 700-2012 Section 601.5 and 11.601.5; and (iii) and ICC 700-2008 Section 601.5 for prefabricated structural components. Note that decisions on compliance 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.

3.1.1 OSB Surface Spline or Block Spline Panels: The core is recessed along the longitudinal edges to receive either two 3-inch-wide-by- $1^{9}/_{32}$ -inch-thick (76.2 mm by 15.1 mm) or thicker OSB surface splines, or one 3-inch-wide (76.2 mm) block spline, manufactured in the same way as the sandwich panel, having a thickness to match the thickness of the sandwich panel core. (See Section 3.2.4 for a description of the splines.) See [Figure 1](#) for illustrations of these panel types.

3.1.2 Dimensional Lumber Spline Panel: The EPS core of this panel type is recessed along the ends to receive 2-by solid sawn dimensional lumber sized to match the thickness of the panel core. The core is recessed along the longitudinal edges to receive 2-by solid sawn dimensional lumber splines sized to match the core thickness of the panel. See [Figure 1](#) for additional information on this panel type.

3.2 Materials:

3.2.1 Core: The core material is Type I expanded polystyrene (EPS) foam plastic with nominal thicknesses ranging from 3 5/8 inches to 11 3/8 inches (92.1 mm to 288.9 mm). The EPS is a Type I expanded polystyrene with a nominal density of 1 pcf (16.0 kg/m³), complying with ASTM C578. The EPS, up to 4 inches (101.6 mm) thick, has a flame spread index of not more than 25 and a smoke developed index of not more than 450 when tested in accordance with ASTM E84. The EPS is supplied by manufacturers having ICC-ES evaluation reports, who are listed in the ICC-ES approved quality control documentation.

3.2.2 Facing: Panel facing material is $1^{9}/_{32}$ -inch thick (15.1 mm), Exposure 1, single-ply oriented strand board (OSB) APA rated with a span rating of 40/20, and complying with the performance-rated panel requirements specified in U.S. Department of Commerce Product Standard PS 2-10. The OSB is supplied by manufacturers listed in the ICC-ES approved quality control documentation.

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 three types of splines: OSB surface splines, block splines and solid sawn dimensional lumber splines. OSB surface splines are 3-inch-wide-by- $1^{9}/_{32}$ -inch-thick (76.2 by 15.1 mm) or thicker 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. Block splines are 3-inch-wide (76.2 mm) sections of Renegade sandwich panels 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 2-by plies of No. 2 Spruce-pine-fir, or better, dimensional lumber members sized in depth to match the core thickness, unless noted otherwise in this evaluation report.

3.2.5 Dimensional Lumber Plates: The EPS core of the panel types is recessed on the ends to receive 2-by solid-sawn dimensional lumber splines sized to match the thickness of the panel core. The dimensional lumber plates installed at the top and bottom of the sandwich panels must be No. 2 Spruce-pine-fir or better. The top of the sandwich panels must be recessed to receive single top and bottom plates unless noted otherwise in this report.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The allowable uniform transverse load, and uniform axial compression load for bearing walls and for walls with openings are as shown in [Tables 1, 2, 3, and 5](#). The allowable uniform transverse loads are for panels installed under simply supported, single span conditions.

The allowable racking shear loads in [Table 4](#) are applicable to the panels used as shearwalls in Seismic Design Categories as indicated therein.

The seismic-force-resisting system consisting of the sandwich panel shear walls, in whole or in part, are to be designed and detailed in accordance with Sections 2305 and 2306 of the IBC by the registered design professional.

Where loading conditions result in the panels resisting combined loads, the sum of the ratios of applied loads over allowable loads must be 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 panels must be connected to each other along their edges with the splines described in Section 3.2.4, 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 and plates with 0.113-inch x 2-1/2-inch (2.9 mm x 63.5 mm) nails, or equivalent, spaced at a maximum of 6 inches (152 mm) on center on both sides of the panel.

Wall openings must be framed with conventional materials, designed to the satisfaction of the code official. See [Table 5](#) for allowable axial and transverse loads of SIPs with openings and dimensions in accordance with [Figures 2](#) and [3](#).

The wall panels used as bearing walls must be installed in the manner described in the footnotes in [Table 3](#). When used as shear walls, the wall panels must be installed in accordance with [Table 4](#).

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

4.2.2 Thermal Barrier:

4.2.2.1 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. All panel ends must be caulked and capped with 2-by dimensional lumber, and joints sealed with a 3-inch (76.2 mm) OSB spline. The wallboard must be fastened to the face of the panels with minimum 1⁵/₈-inch-long (31.7 mm) screws spaced at 8 inches (203 mm) on center around the edges and 12 inches (305 mm) on center in the field. All joints were taped and floated.

4.2.2.2 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.

4.2.3 Panel Cladding:

4.2.3.1 Roof Covering: The roof covering must comply with Chapter 15 of the IBC, or IRC Section R901, as applicable. Roof coverings installed with the application of heat are prohibited unless reviewed and approved by the registered design professional. Underlayment and flashing must be installed in accordance with the applicable code.

4.2.3.2 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 IBC Section 1404.2 or IRC Section R703.2, as applicable, prior to application of the wall covering.

4.2.4 Fire-resistance-rated Assemblies:

4.2.4.1 One-hour, Limited Load Bearing, Fire-resistance-rated Wall Assembly: Renegade Panels having a thickness of 6-13/16-inch (173.0 mm), as described in Section 3.1, protected with two layers of 5/8-inch (15.9 mm)-thick, Type X gypsum wallboard, field-installed on both faces, are a one-hour fire-resistance rated assembly. The EPS core of the panels must be recessed at the top and bottom of the panel for the installation of nominally 2-by Spruce-pine-fir lumber top and bottom plates sized to match the panel's core thickness.

Splines: A single 4-by No. 2 Spruce-pine-fir or double 2-by No. 2 Spruce-pine-fir dimensional lumber spline must be installed in the vertical panel edges spaced a maximum of 48 inches (1219 mm) on center. The double 2-by wood splines are to be fastened together with two rows of 0.148-inch x 3-inch (3.8 mm x 76.2 mm) smooth shank nails spaced at 12 inches (305 mm) on center and 1½ inches (38.1 mm) from both edges.

OSB Facings: OSB facings of the panels must be secured to the top plate, bottom plate and splines with 0.113-inch x 2½-inch (2.9 mm x 63.5 mm) smooth shank nails spaced at 4 inches (102 mm) on center.

Cladding: Both layers of gypsum wallboard must be installed vertically. The base layer must be attached to the OSB facing with #8 x 1⅝-inch-long (41.3 mm) bugle head screws spaced at 8 inches (203 mm) on center along the perimeter and 12 inches (305 mm) on center in the field. The vertical joints of the face layer of gypsum wallboard must be offset a minimum of 12 inches (305 mm) from the vertical joints of the base layer. The face layer must be attached to the base layer with #8 x 2½-inch-long (63.5 mm) bugle head screws spaced at 8 inches (203 mm) on center along the perimeter and 12 inches (305 mm) on center in the field. The face layer must receive a Level 2 finish in accordance with ASTM C840 or GA216.

The fire-resistance-rated wall assembly is limited to maximum wall height of 12 feet (2438 mm), and a maximum superimposed allowable axial compression load of 3000 pounds per foot (43.7 kN/m).

4.2.4.2 Two hour, Limited Load Bearing, Fire-resistance-rated Wall Assembly: Renegade Panels having a thickness of 6-13/16-inch (173.0 mm), as described in Section 3.1, protected with three layers of ⅝-inch-thick (15.9 mm) Type X gypsum wallboard, field-installed on both faces, are a two-hour fire-resistance rated assembly. The EPS core of the panels must be recessed at the top and bottom of the panel for the installation of nominally 2-by Spruce-pine-fir lumber top and bottom plates sized to match the panel's core thickness.

Splines: A single 4-by No. 2 Spruce-pine-fir dimensional lumber spline must be installed in the vertical panel edges spaced a maximum of 48 inches (1219 mm) on center.

OSB Facings: OSB facings of the panels must be secured to the top plate, bottom plate and splines with 0.113-inch x 2½-inch (2.9 mm x 63.5 mm) smooth shank nails spaced at 4 inches (102 mm) on center.

Cladding: All layers of gypsum wallboard must be installed vertically. The base layer must be attached to the OSB facing with #8 x 1⅝-inch-long (41.3 mm) bugle head screws spaced at 8 inches (203 mm) on center along the perimeter and 12 inches (305 mm) on center in the field. The vertical joints of the middle layer of gypsum wallboard must be offset a minimum of 12 inches (305 mm) from the vertical joints of the base layer. The middle layer must be attached to the base layer with #8 x 2½-inch-long (63.5 mm) bugle head screws spaced at 8 inches (203 mm) on center along the perimeter and 12 inches (305 mm) on center in the field. The vertical joints of the face layer of gypsum wallboard must be offset and attached to the middle layer, similar to how the middle layer is offset and attached to the base layer. The face layer must receive a Level 2 finish in accordance with ASTM C840 or GA216.

The fire-resistance-rated wall assembly is limited to maximum wall height of 12 feet (2438 mm), and a maximum superimposed allowable axial compression load of 3000 pounds per foot (43.7 kN/m).

4.3 Special Inspection:

Where Renegade Panel shear walls are installed in buildings in IBC Seismic Design Categories C, D, E and F; Seismic Design Categories C, D₀, D₁, D₂ and E for townhouses under the IRC; or Seismic Design Categories D₀, D₁, D₂ and E for detached one and two-family dwellings under the IRC, periodic inspections of the fastening and anchoring of the shear wall assembly within the seismic-force-resisting system must be provided. Inspection must include connection of the assemblies to drag struts and hold-downs, in accordance with 2015 IBC Section 1705.11.1 or 1705.12.2, 2012 IBC Section 1705.10.1 or 1705.11.2, 2009 IBC Section 1706.2 or 1707.3, or 2006 IBC Section 1707.3, as applicable, unless these are exempted by 2015 and 2012 IBC Section 1704.2 or 2009 and 2006 IBC Section 1704.1.

5.0 CONDITIONS OF USE:

The Renegade Panel System described in this report complies with, or is a suitable alternative 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 [5](#) of 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 Renegade Panel shear walls are used in buildings 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 All floor-to-wall and roof-to-wall details must be designed such that gravity loads are applied to the wall panels as described in the footnotes in [Table 3](#).
- 5.5 Connection and attachments of the panel are outside the scope of this report and must be addressed in the design calculations and details.
- 5.6 When used as shear walls under the IBC or IRC, the panels are recognized for use in Seismic Design Categories A, B and C, except as provided for in Section 4.1. Use of the sandwich panel shear walls in Seismic Design Categories D, E and F in combination with other types of lateral force-resisting systems is outside the scope of this report.
- 5.7 Special inspections shall be as required in Section 4.3.
- 5.8 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.
- 5.9 Use of the panels in occupancies that require concentrated floor live loads under IBC Section 1607.4 is outside scope of this report.
- 5.10 Use of the panels is limited to Type V construction.
- 5.11 Allowable loads in [Tables 1](#) through [5](#) may not be increased for other durations of loading.
- 5.12 Use of the foam plastic in areas subject to damage from termites must be in accordance with 2015, 2009 and 2006 IBC Section 2603.8, or 2012 IBC Section 2603.9 and 2015, 2012 and 2009 IRC Section R318.4, or 2006 IRC Section R320.5, as applicable.
- 5.13 The panels must be installed such that the panel facings are protected against decay and termites in accordance with 2015 IBC Sections 2304.12.1.2 and 2304.12.1.5 or 2012, 2009 and 2006 IBC Sections 2304.11.2.2 and 2304.11.2.6, or 2015, 2012 and 2009 IRC Sections R317 and R318, 2006 IRC Sections R319 and R320, as applicable.
- 5.14 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.
- 5.15 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.
- 5.16 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.
- 5.17 Manufacturing of the Renegade Panel System is currently not recognized under this ICC-ES Evaluation Report until the manufacturing location is qualified under an inspection 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 February 2012 (editorially revised July 2015), including Appendix A of AC04.
- 6.2 Reports of tests conducted in accordance with ASTM E119.
- 6.3 Report of a room corner fire test conducted in accordance with NFPA 286

7.0 IDENTIFICATION

7.1 The panels must have a label containing the name and address of the sandwich panel manufacturer, the product panel number, and the evaluation report number (ESR-4382). Bundles of Block splines are delivered to the jobsite with shipping documents from the sandwich panel manufacture.

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

MM&I CONSTRUCTION AND DESIGN, INC.
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NASHVILLE, TENNESSEE, 37221
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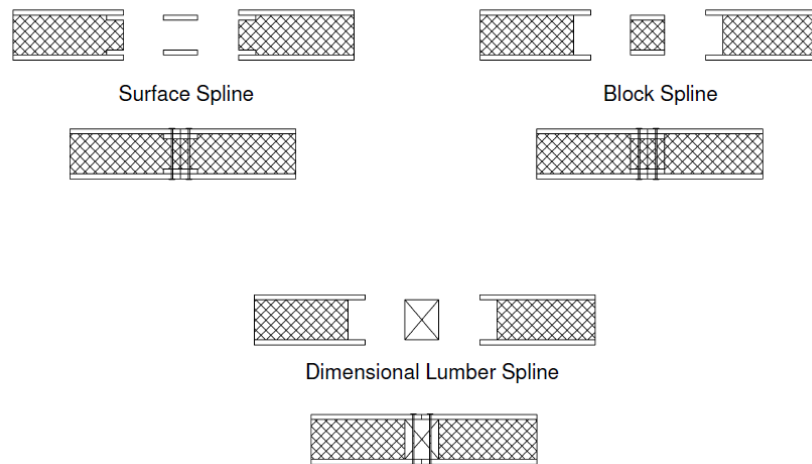


FIGURE 1—TYPE OF LONGITUDINAL SPLINES

TABLE 1—ALLOWABLE UNIFORM TRANSVERSE LOADS FOR PANELS WITH BLOCK SPLINES OR OSB SURFACE SPLINES (psf)^{1,2,3,5,6}

THICKNESS (inches)		DEFLECTION LIMITS	PANEL SPAN (feet)								
Panel	Core		8	10	12	14	16	18	20	22	24
4 ^{13/16} ⁴	3 ^{5/8}	L/180	66.1	48.1	33.0	-	-	-	-	-	-
		L/240	49.5	36.1	25.0	-	-	-	-	-	-
		L/360	33.0	24.0	17.0	-	-	-	-	-	-
6 ^{13/16} ⁴	5 ^{5/8}	L/180	74.8	57.5	46.6	39.2	33.9	29.8	-	-	-
		L/240	74.8	57.5	44.6	35.1	28.1	22.7	-	-	-
		L/360	51.6	38.5	29.7	23.4	18.7	15.1	-	-	-
8 ^{9/16} ⁴	7 ^{3/8}	L/180	80.9	61.4	49.5	41.5	35.7	31.3	27.9	-	-
		L/240	80.9	61.4	49.5	41.5	35.7	31.3	26.6	-	-
		L/360	68.0	51.5	40.2	32.1	26.1	21.4	17.7	-	-
10 ^{9/16}	9 ^{3/8}	L/180	79.5	63.6	52.5	43.8	37.5	32.8	29.2	26.3	23.9
		L/240	79.5	63.6	52.5	43.8	37.5	32.8	29.2	26.3	23.9
		L/360	79.5	63.6	52.5	42.4	34.8	28.9	24.2	20.5	17.4
12 ^{9/16}	11 ^{3/8}	L/180	68.8	55.0	45.8	39.3	34.4	30.6	27.5	25.0	22.9
		L/240	68.8	55.0	45.8	39.3	34.4	30.6	27.5	25.0	22.9
		L/360	68.8	55.0	45.8	39.3	34.4	30.6	27.5	25.0	22.6

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

¹The tabulated values are for panels with single span simply supported conditions with the panels supported each end on minimum 1 1/2-inch wide continuous supports in contact with the face of the panels, such as roof and floor panels. Solid wood plates must be provided at bearing locations. Tabulated values do not include the self-weight of the panel or the effects of creep and are based on short duration loads only.

²Tabulated values are applicable to panels installed with either the block or OSB surface splines described in Section 3.1.1 installed at the longitudinal panel joints.

³Tabulated values are applicable to panels installed with the strong axis of the OSB panel facers parallel to the panel span.

⁴For wall panels (4^{13/16}, 6^{13/16} and 8^{9/16} inch panel thicknesses only) with single span simply supported conditions with the panels supported each end by lumber plates installed in the core recesses each end of the panel, the allowable load shall be multiplied by a factor of 0.80 for 4^{13/16} and 6^{13/16} inch wall panel thicknesses and 0.70 for 8^{9/16} inch wall panel thickness. The design of the lumber plate connection to the structure must be justified to the satisfaction of the code official. The lumber plates must be 2-inch nominal width, No. 2 Spruce-pine-fir, or better, for 2 x 4 and 2 x 6 plates and No. 2 Hem-fir, or better, for 2 x 8 and 2 x 10 plates. The OSB panel facers must be attached to the lumber plates as described in Section 4.2.1.

⁵Permanent loads must be less than 50 percent of the tabulated load.

⁶Roofs must be designed to support a 300 pound concentrated load according to IBC Section 1607.4 when the roof has access to maintenance worker

TABLE 2—ALLOWABLE UNIFORM TRANSVERSE LOADS FOR PANELS WITH DIMENSIONAL LUMBER SPLINES (psf)^{1,2,3,4}

THICKNESS (inches)		DEFLECTION LIMITS	PANEL SPAN (feet)								
Panel	Core		8	10	12	14	16	18	20	22	24
4 ^{13/16}	3 ^{5/8}	L/180	64.1	51.3	39.4	-	-	-	-	-	-
		L/240	57.8	40.3	29.5	-	-	-	-	-	-
		L/360	38.5	26.9	19.7	-	-	-	-	-	-
6 ^{13/16}	5 ^{5/8}	L/180	77.6	64.4	53.7	45.9	38.7	33.5	-	-	-
		L/240	77.6	64.4	53.7	41.1	32.1	25.6	-	-	-
		L/360	72.5	49.4	36.0	27.4	21.4	17.0	-	-	-
8 ^{9/16}	7 ^{3/8}	L/180	88.2	71.4	60.8	53.2	44.1	37.6	32.9	-	-
		L/240	88.2	71.4	60.8	53.2	44.1	37.6	31.3	-	-
		L/360	88.2	70.1	53.6	41.2	32.2	25.7	20.9	-	-
10 ^{9/16}	9 ^{3/8}	L/180	103.3	80.2	66.6	57.3	50.5	42.9	37.0	32.5	29.1
		L/240	103.3	80.2	66.6	57.3	50.5	42.9	37.0	32.5	29.1
		L/360	103.3	80.2	66.6	53.6	43.3	35.4	29.2	24.3	20.4
12 ^{9/16}	11 ^{3/8}	L/180	119.5	90.1	73.3	62.3	54.4	47.9	40.9	35.6	31.6
		L/240	119.5	90.1	73.3	62.3	54.4	47.9	40.9	35.6	31.6
		L/360	119.5	90.1	73.3	62.3	54.4	47.9	40.9	34.5	28.9

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

¹The tabulated values are for panels with single span simply supported conditions, with the panels supported each end on minimum 1 1/2-inch wide continuous supports in contact with the face of the panels, such as roof and floor panels. Solid wood plates must be provided at bearing locations. Tabulated values do not include the self-weight of the panel or the effects of creep and are based on short duration loads only.

²The tabulated values are applicable to panels installed with the strong axis of the OSB panel facer parallel to the panel span, and with the dimensional lumber splines described in Section 3.1.2 installed at 4 feet on center, parallel to the panel span. The 2 x 4, 2 x 6, 2 x 8 and 2 x 10 splines must be No. 2 Spruce-pine-fir, or better, and the 2 x 12 splines must be No. 2 Hem-fir, or better. The OSB panel facers must be attached to the splines as described in Section 4.2.1.

³Permanent loads must be less than 50 percent of the tabulated load.

⁴Roofs must be designed to support a 300 pound concentrated load according to IBC Section 1607.4 when the roof has access to maintenance workers.

TABLE 3—ALLOWABLE UNIFORM AXIAL LOADS FOR WALL PANELS WITH BLOCK OR OSB SURFACE SPLINES (plf)^{1,2,3,4,5,6,7,8}

THICKNESS (inches)		WALL PANEL HEIGHT (feet)						
Panel	Core	8	10	12	14	16	18	20
4 ^{13/16}	3 ^{5/8}	3980	3630	3270	-	-	-	-
6 ^{13/16}	5 ^{5/8}	4770	4670	4540	4390	4200	4000	-
8 ^{9/16}	7 ^{3/8}	4910	4850	4770	4670	4570	4440	4300

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

¹The tabulated loads are uniform axial loads applied concentrically to the full thickness of the panels, including panel facings.

²The tabulated values are for panels installed with the strong axis of the OSB panel facers parallel to the wall height (panel span).

³The tabulated values are for wall panels installed with a dimensional lumber top plate recessed into the core of the panel. The lumber must be No. 2 Spruce-pine-fir, or better, except 2 x 12 lumber, which must be No. 2 Hem-fir, or better. The base and top of the SIPS must be fully bearing, including facings, on structural supports.

⁴Tabulated allowable axial load is based on a SIP with a maximum height to width ratio of 2:1.

⁵For fire-resistance-rated wall assemblies, axial load limitations in Section 4.2.4 must be observed.

⁶For combined loading, the requirements in Section 4.1 must be applied.

⁷The OSB panel facers must be attached to the lumber end plates as described in Section 4.2.1.

⁸Permanent loads must be less than 50 percent of the tabulated load.

TABLE 4—ALLOWABLE LATERAL IN-PLANE RACKING SHEAR LOAD FOR SHEAR WALL ASSEMBLIES CONSISTING OF RENEGADE SIPs^{1,2,5,8,10}

SEISMIC DESIGN CATEGORY	SPLINE TYPE	MINIMUM SIP THICKNESS (inches)	BOTTOM PLATE	TOP PLATE	MINIMUM END POSTS	FACING NAIL SPACING ⁹ (inches)	ALLOWABLE SHEAR LOADS (plf)
A, B, C ⁶	Surface or Block	4 ¹³ / ₁₆	Single 2-by	Double 2-by ³	Single 2-by	Single row at 6" o.c.	280
		6 ¹³ / ₁₆					330
		8 ⁹ / ₁₆					330
A through F ^{7,11}	Surface or Block	4 ¹³ / ₁₆	Single 2-by	Double 2-by ⁴	Single 4-by	2 rows at 6" o.c.	748

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

- ¹The panels must be installed with the strong axis of the OSB facers oriented vertically.
- ²The maximum the maximum height-to-length ratio is 1:1. Wall heights greater than 96 inches are outside the scope of this report.
- ³The double top plates must be recessed into the EPS core and nailed together with 0.131-inch x 3 inch 10d common nails spaced at 4 inches on center in two staggered rows (8 inches on center for each row).
- ⁴The double top plates must be nailed together with 0.148-inch x 3 inch 10d common nails spaced at 3 inches on center in two staggered rows (6 inches on center for each row).
- ⁵The shearwall end posts and splines must be continuous and must bear on the top and bottom plates.
- ⁶The dimensional lumber bottom plates, top plates and end posts must be No. 2 Spruce-pine-fir, or better.
- ⁷The dimensional lumber bottom plates, top plates and end posts must be No.1 Douglas-fir Larch, or better.
- ⁸The splines must be as described in Section 3.2.4.
- ⁹The nails used to attach the OSB facers of the panels to the bottom plates, top plates, splines and end posts must be 0.113-inch x 2.5 inch round head smooth shank nails, 3/4 inch from the edges and ends of the sandwich panels for single row nails, and 3/8 inch and 3/4 inch from edges and ends of sandwich panels for double row nails. The nails must have a minimum bending yield strength, F_{yb}, of 100 ksi (689 MPa).
- ¹⁰All of the installation configurations are recognized for use in Seismic Design Categories A, B and C.
- ¹¹Installation configuration is also recognized as non-load-bearing shear walls for use in Seismic Design Categories D, E and F with the seismic design coefficient of R = 6.5, Ω_o = 3.0, and C_d = 4.0 under the following provisions:
 - a. A hold-down device must be attached to the vertical studs 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.
 - b. The wall panels 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. The member, element or structure supporting the shear wall and the vertical restraint provided to the facers of the SIPs at the top and bottom of wall panel must be designed and detailed by a registered design professional.
 - c. Shearwalls must be supported by a rigid foundation, such as a concrete foundation.
 - d. Vertical splines must be placed at 48 inches on center maximum.

TABLE 5— ALLOWABLE TRANSVERSE AND AXIAL LOADS FOR WALL PANELS WITH OPENINGS (psf)^{1,2,3,4,5}

CORE THICKNESS (inches)	DEFLECTION LIMITS	12" HEADER DEPTH ⁶		36" HEADER DEPTH ⁷	
		TRANSVERSE (PSF)	AXIAL ^{8,9} (PLF)	TRANSVERSE (PSF)	AXIAL ^{8,9} (PLF)
5 ⁵ / ₈	L/180	22.6	550	26.3	1250
	L/240	22.6		26.3	
	L/360	18.0		18.8	
7 ³ / ₈	L/180	27.6	500	31.2	1300
	L/240	27.6		31.2	
	L/360	25.3		26.5	

- ¹The tabulated values are for panels with single span simply supported conditions with the panels supported each end on minimum 1 1/2-inch wide continuous supports in contact with the face of the panels.
- ²The nails used to attach the OSB facers of the panels to the bottom plates, top plates, jambs and end posts must be 0.113-inch x 2.5 inch round head smooth shank nails at 6 inches on center, 3/4 inch from the edges and ends of the sandwich.
- ³The dimensional lumber bottom plates, top plates, opening framing, and end posts must be No. 2 Spruce-pine-fir, or better.
- ⁴Allowable loads are applicable for wall panels with openings configured as shown in [Figures 2 and 3](#).
- ⁵Permanent loads must be less than 50 percent of the tabulated loads.
- ⁶The panels must be installed with the strong axis of the OSB facers oriented horizontally.
- ⁷The panels must be installed with the strong axis of the OSB facers oriented vertically.
- ⁸The base of the SIPs must be fully bearing, including facings, on structural supports.
- ⁹The tabulated loads are uniform axial loads applied concentrically to the full thickness of the panels, including panel facings.

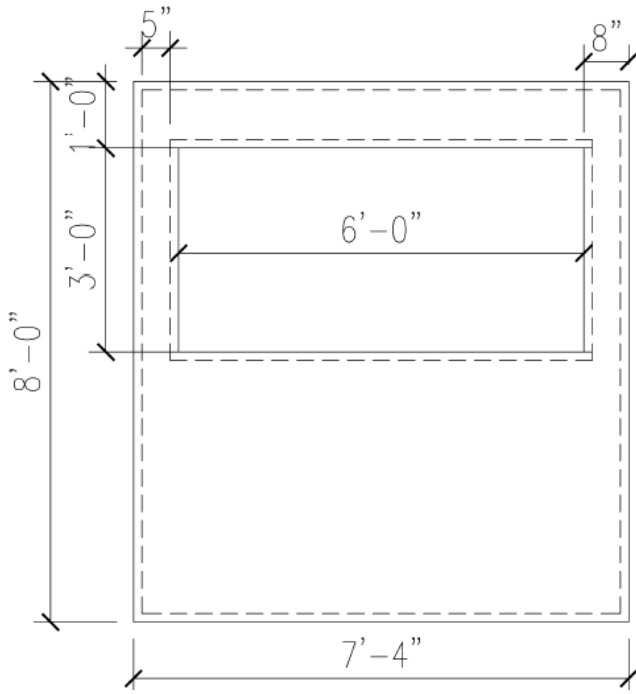


FIGURE 2—WALL PANEL OPENING WITH 1-FOOT HEADER

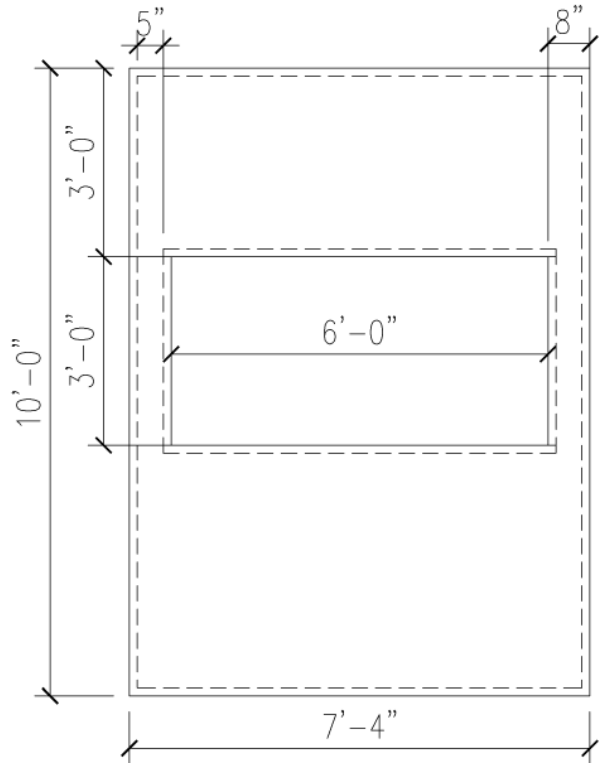


FIGURE 3—WALL PANEL OPENING WITH 3-FOOT HEADER