

Technical Bulletin

NTA Assembly Listing Reports for Insulspan SIP System Seismic Zones A, B, C, D, E & F

(9 pages attached)

This bulletin addresses quasi-static cyclic (reversed) load tests conducted at APA – The Engineered Wood Association (APA) to evaluate the performance of SIP shear wall assemblies for use in Seismic Design Categories D, E and F. Tests were performed following the Structural Engineers Association of Southern California (SEAOSC), *Standard Method of Cyclic (Reversed) Test for Shear Resistance of Framed Walls for Buildings*, (revised January 20, 1997) which is based upon the Sequential Phased Displacement (SPD) loading protocol.

The APA test program included testing of Insulspan SIP shear wall assemblies and matched light-frame (conventional) walls sheathed with wood-based structural panels for comparison. Table 1 defines the Insulspan SIP shear wall assemblies tested by APA. The conventional walls tested were constructed using the same nail spacing and boundary plate configuration (i.e. top plate, bottom plate and end post) as the SIP shear wall assemblies. The interior framing for the conventional walls were double 2x lumber spaced at 24" (610 mm) on center for walls matching NTA Assembly Listing INS(602)092310-27. The interior framing for the conventional walls was single 4x lumber spaced at 24" (610 mm) on center for walls matching NTA Assembly Listings INS(602)111010-19 and INS(602)111010-20.

NTA Technical Implementation Procedure, **NTA IM 14 TIP 10.0, Qualification of Wood Structural Panel Faced SIPs for use in Seismic Zone D, E and F**, establishes requirements for evaluating structural insulated panels (SIPs) faced with wood structural panels in Seismic Design Categories D, E, and F of the International Building Code (IBC) and ASCE 7. The NTA evaluation is based upon confirming equivalent cyclic behavior between a conventionally constructed wood frame wall sheathed with wood-based structural panels mechanically fastened to wood framing members (ASCE 7 Table 12.2.-1 System A13) and a SIP wall assembly constructed to have the same nominal capacity. The performance requirements assure that the tested SIP details are equivalent to System A13 in ASCE 7 Table 12.2.-1 and permit the use of the seismic design coefficients, height limits, and detailing requirements for SIP lateral force resisting systems constructed based on the details from this evaluation.

The attached NTA assembly listing reports provide details for the use shear wall assemblies with minimum EPS core thickness of 5 5/8 constructed using the Insulspan SIP System in **Seismic Zones A, B, C, D, E and F**. A general description of the assembly listings is provided in Table 1 below; however, refer to the referenced NTA assembly listings for detailed application information.

Table 1 – NTA Assembly Reports - Insulspan SIP System

NTA Assembly Listings	Bottom Plates	Top Plates & End Posts	Panel to Panel Connection	Nail Spacing
INS(602)092310-27	Min. Single 4"x6" (89 x 140 mm)	Min. Double 2"x6" (38 x 140 mm)	OSB Spline or Block Spline	8d nails @ 6" (152 mm)
INS(602)092310-27	Min. Single 4"x6" (89 x 140 mm)	Min. Double 2"x6" (38 x 140 mm)	Double 2x Lumber Spline	8d nails @ 6" (152 mm)
INS(602)111010-19	Min. Single 4"x6" (89 x 140 mm)	Min. Single 4"x6" (89 x 140 mm)	Single 4x Lumber Spline	8d nails @ 4" (102 mm)
INS(602)111010-20	Min. Single 4"x6" (89 x 140 mm)	Min. Single 4"x6" (89 x 140 mm)	Single 4x Lumber Spline	8d nails @ 2" (51 mm)

**Assembly No. INS(602)092310-27
Insulspan Structural Insulated Wall Panels
for use in Seismic A, B, C, D, E and F construction**

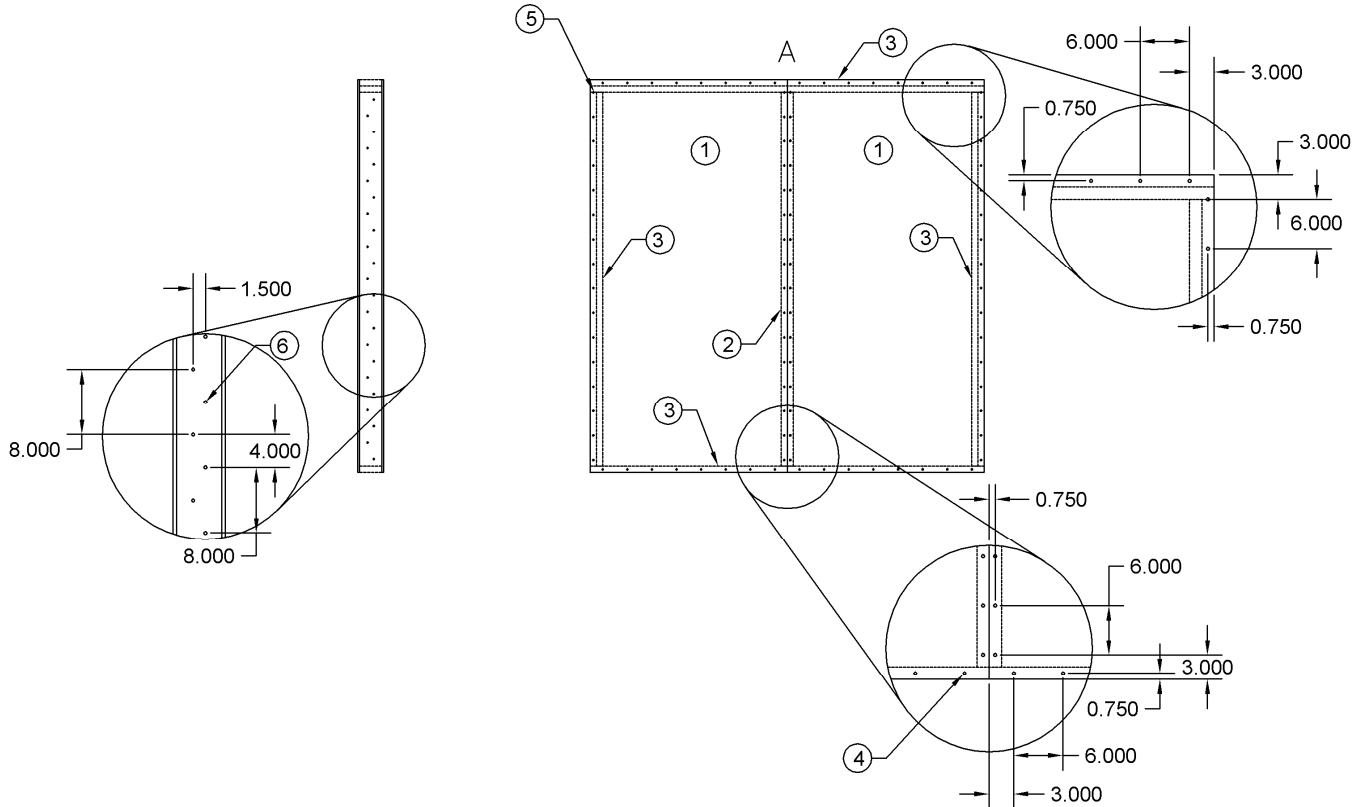


Figure 1: Assembly Drawing for Seismic Resistance

Report Holder
Plasti-Fab Ltd.
100, 2886 Sunridge Way NE
Calgary, Alberta T1Y 7H9

Manufacturing Locations
PFB Manufacturing, LLC (NTA Plant #603)
(Insulspan SIP Plant)
245 N. Jipson Street
Blissfield, MI 49228-1167

Plasti-Fab Ltd (NTA Plant #626)
(Insulspan SIP Plant)
Unit 1, 600 Chester Road
Annacis Business Park
Delta, BC V3M 5Y3

1. SUBJECT

1.1. Insulspan Structural Insulated Wall Panels for use in Seismic A, B, C, D, E and F construction

2. SCOPE

NTA, Inc. has evaluated the above product(s) in accordance with:

- 2.1. NTA IM 014 Structural Insulated Panel Evaluation
- 2.1.1. IM 014 TSK 10.0 Seismic D, E and F Evaluation

To obtain the most current NTA Listing Report visit www.ntainc.com/product-certification/.

This listing report is intended to indicate that NTA Inc. has evaluated data pertaining to the described assembly and has found that when constructed in accordance with this listing the data herein applies. NTA Inc. makes no warranty, either expressed or implied, regarding the product covered by this report.

**3. Construction Components (Ref. Figure 1)**

3.1. (#1) Structural Insulated Panels. *Insulspan Structural Insulated Panels* consisting of minimum nominal 5-½ in. thick EPS core laminated between two sheets of minimum 7/16 in. thick oriented strand board (OSB). SIPs shall bear the ESR-1295 listing mark.

3.2. (#2) Splines. *Insulspan Structural Insulated Panels* for use in seismic construction are interconnected with insulated OSB (Block) splines, 3 in. wide and thickness equal to the core thickness of the SIP, along the full length of the spline connection. Alternatively, #2 Douglas Fir Double 2x lumber may be used in place of the block spline.

3.3. (#3) Chords and Top and Bottom Plates. *Insulspan Structural Insulated Panels* for use in seismic construction shall use #2 Douglas Fir Double 2x Top Plates and Chords with a single 2x Bottom Plate.

3.4. Fasteners. *Insulspan Structural Insulated Panels* shall be fastened in accordance with Figure 1.

3.4.1. (#4) 8d Nails, 0.113 in. x 2-1/2 in. applied 6 in. o.c. around the panel perimeter and 6 in. o.c. on both sides of the spline connection.

3.4.2. (#5) 10d Nails, 0.131 in. x 3 in. (3) fasteners used to end nail the top and bottom plates at each chord..

3.4.3. (#6) 10d Nails, 0.131 in. x 3 in. used for double plates and chords 8 in. o.c. in two rows, staggered.

3.5. Hold-downs. Designed in accordance with accepted engineering practice to resist design chord forces.

4. DESIGN

4.1. Design Approval. Where required by the authority having jurisdiction, structures using *Insulspan Structural Insulated Panels* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details, and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation. ^(IM 014 NACU4)

4.2. Connection to Structure. Designed in accordance with accepted engineering practice to transfer racking forces into the wall at the top and out of the wall at the base.

4.3. Design Loads. Design loads to be resisted by the SIP panels shall be as required under the applicable building code. Loads on the panels shall not exceed the loads noted in this report.

4.4. In-Plane Shear Design. Shear walls shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 1. 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.

4.5. Seismic Design Categories. The shear wall configurations in Table 1 are permitted in Seismic Design Categories A, B, C, D, E and F. Such walls shall be designed using the seismic design coefficients and limitations provided in ASCE 7-05 for light-framed walls sheathed with wood structural panels rated for shear resistance (SFRS A13). These SIP panels shall use the following factors for design: Response Modification Coefficient, $R = 6.5$; System Overstrength Factor, $Q_0 = 3.0$; Deflection Amplification Factor, $C_d = 4.0$. ^(IM 014 ACU16)

4.6. Adhesives and Sealants. Adhesives and sealants shall not be applied at wood-to-wood or spline-to-facing interfaces in shear walls in Seismic Design Categories D, E and F. Adhesives and sealants may be applied to wood-to-foam or facing-to-foam interfaces. Flexible SIP tape may be applied over panel joints.

This listing report is intended to indicate that NTA Inc. has evaluated data pertaining to the described assembly and has found that when constructed in accordance with this listing the data herein applies. NTA Inc. makes no warranty, either expressed or implied, regarding the product covered by this report.



**Table 1: Allowable In-Plane Shear Strength (Pounds per Foot)
for SIP Shear Walls (Seismic Loads in Seismic Design Categories A, B, C, D, E and F)^{1,2}**

Spline Type	Framing Minimum SG ⁵	Minimum Facing Connections ²			Shear Strength ⁶ (plf)
		Chord ²	Plate ²	Spline	
OSB Block Spline ³	0.50	0.113" x 2-1/2" nails, 6 in. o.c., 3/4 in. edge distance	0.113" x 2-1/2" nails, 6 in. o.c. , 3/4 in. edge distance	0.113" x 2-1/2" nails, 6 in. o.c., 3/4 in. edge distance	360
Double 2x #2 Douglas Fir ⁴	0.50	0.113" x 2-1/2" nails, 6 in. o.c., 3/4 in. edge distance	0.113" x 2-1/2" nails, 6 in. o.c., 3/4 in. edge distance	0.113" x 2-1/2" nails, 6 in. o.c., 3/4 in. edge distance	360

¹Allowable seismic design coefficients are provided in Section 4.5.

²Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.

³The maximum assembly height-to-width ratio shall be 2:1 when are used in Seismic Design Categories A, B and C. The maximum assembly height-to-width ratio shall be 1:1 when are used in Seismic Design Categories D, E and F.

⁴The maximum assembly height-to-width ratio shall be 2:1.

⁵Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.

⁶Shear strength values are based on constructions found in ESR-1539 which have been determined to be equivalent.

This listing report is intended to indicate that NTA Inc. has evaluated data pertaining to the described assembly and has found that when constructed in accordance with this listing the data herein applies. NTA Inc. makes no warranty, either expressed or implied, regarding the product covered by this report.

**Assembly No. INS(602)111010-19
Insulspan Structural Insulated Wall Panels
for use in Seismic A, B, C, D, E and F construction**

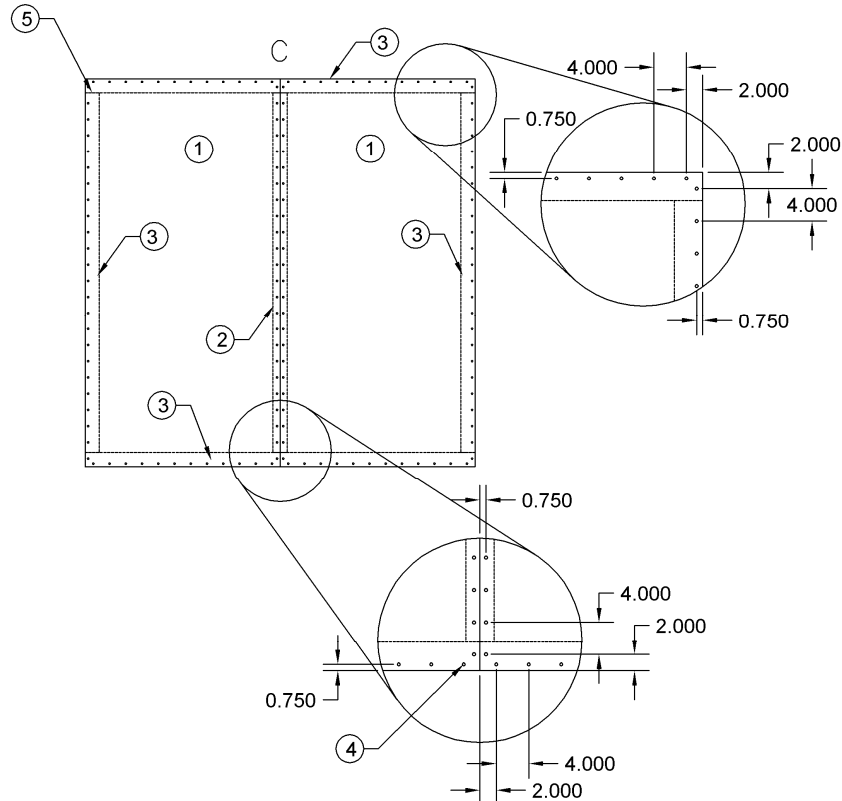


Figure 1: Assembly Drawing for Seismic Resistance

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Unit 1, 600 Chester Road
Annacis Business Park
Delta, BC V3M 5Y3

1. SUBJECT

1.1. Insulspan Structural Insulated Wall Panels for use in Seismic A, B, C, D, E and F construction

2. SCOPE

NTA, Inc. has evaluated the above product(s) in accordance with:

- 2.1. NTA IM 014 Structural Insulated Panel Evaluation**
- 2.1.1. IM 014 TSK 10.0 Seismic D, E and F Evaluation**

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**3. Construction Components (Ref. Figure 1)**

3.1. (#1) Structural Insulated Panels. *Insulspan Structural Insulated Panels* consisting of minimum nominal 5-½ in. thick EPS core laminated between two sheets of minimum 7/16 in. thick oriented strand board (OSB). SIPs shall bear the ESR-1295 listing mark.

3.2. (#2) Splines. *Insulspan Structural Insulated Panels* for use in seismic construction are interconnected with #2 Douglas Fir 4x lumber along the full length of the spline connection.

3.3. (#3) Chords and Top and Bottom Plates. *Insulspan Structural Insulated Panels* for use in seismic construction shall use #2 Douglas Fir Double 4x Top Plate, Chords and Bottom Plate.

3.4. Fasteners. *Insulspan Structural Insulated Panels* shall be fastened in accordance with Figure 1.

3.4.1. (#4) 8d Nails, 0.113 in. x 2-1/2 in. applied 4 in. o.c. around the panel perimeter and 4 in. o.c. on both sides of the spline connection.

3.4.2. (#5) 10d Nails, 0.131 in. x 3 in. (4) fasteners used to toe nail the top and bottom plates at each chord..

3.5. Hold-downs. Designed in accordance with accepted engineering practice to resist design chord forces.

4. DESIGN

4.1. Design Approval. Where required by the authority having jurisdiction, structures using *Insulspan Structural Insulated Panels* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details, and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation. ^(IM 014 NACU4)

4.2. Connection to Structure. Designed in accordance with accepted engineering practice to transfer racking forces into the wall at the top and out of the wall at the base.

4.3. Design Loads. Design loads to be resisted by the SIP panels shall be as required under the applicable building code. Loads on the panels shall not exceed the loads noted in this report.

4.4. In-Plane Shear Design. Shear walls shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 1. 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.

4.5. Seismic Design Categories. The shear wall configurations in Table 1 are permitted in Seismic Design Categories A, B, C, D, E and F. Such walls shall be designed using the seismic design coefficients and limitations provided in ASCE 7-05 for light-framed walls sheathed with wood structural panels rated for shear resistance (SFRS A13). These SIP panels shall use the following factors for design: Response Modification Coefficient, $R = 6.5$; System Overstrength Factor, $Q_0 = 3.0$; Deflection Amplification Factor, $C_d = 4.0$. ^(IM 014 ACU16)

4.6. Adhesives and Sealants. Adhesives and sealants shall not be applied at wood-to-wood or spline-to-facing interfaces in shear walls in Seismic Design Categories D, E and F. Adhesives and sealants may be applied to wood-to-foam or facing-to-foam interfaces. Flexible SIP tape may be applied over panel joints.

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**Table 1: Allowable In-Plane Shear Strength (Pounds per Foot)
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Spline Type	Framing Minimum SG ⁴	Minimum Facing Connections ²			Shear Strength (plf)
		Chord ²	Plate ²	Spline	
4x #2 Douglas Fir ³	0.50	0.113" x 2-1/2" nails, 4 in. o.c., 3/4 in. edge distance	0.113" x 2-1/2" nails, 4 in. o.c., 3/4 in. edge distance	0.113" x 2-1/2" nails, 4 in. o.c., 3/4-in. edge distance	540

¹Allowable seismic design coefficients are provided in Section 4.5.

²Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.

³The maximum assembly height-to-width ratio shall be 2:1.

⁴Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.

This listing report is intended to indicate that NTA Inc. has evaluated data pertaining to the described assembly and has found that when constructed in accordance with this listing the data herein applies. NTA Inc. makes no warranty, either expressed or implied, regarding the product covered by this report.

**Assembly No. INS(602)111010-20
Insulspan Structural Insulated Wall Panels
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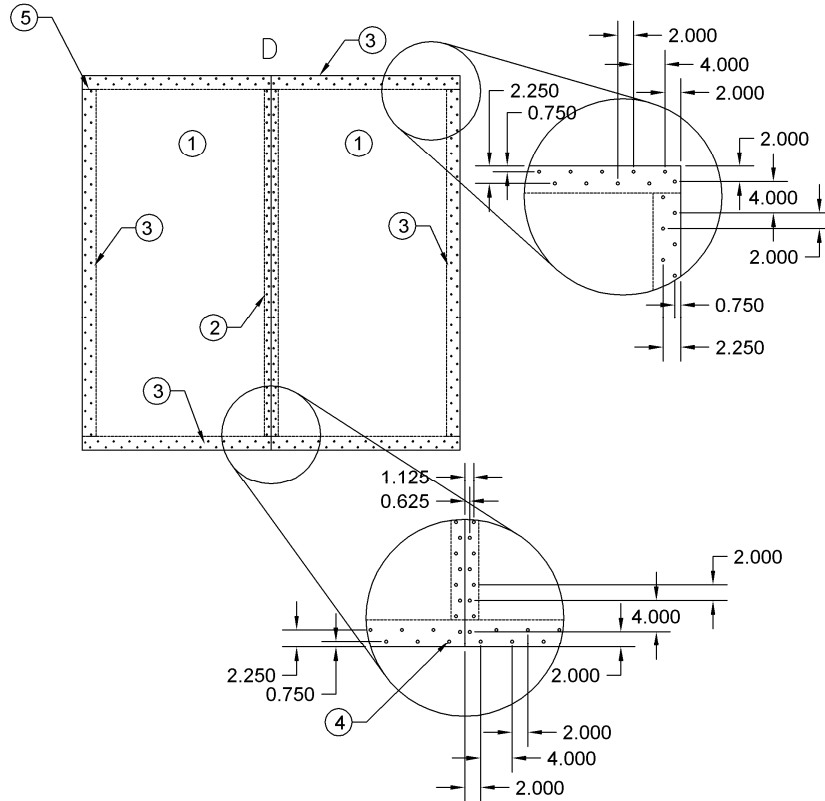


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- 2.1.1. IM 014 TSK 10.0 Seismic D, E and F Evaluation**

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**3. Construction Components (Ref. Figure 1)**

3.1. (#1) Structural Insulated Panels. *Insulspan Structural Insulated Panels* consisting of minimum nominal 5-1/2 in. thick EPS core laminated between two sheets of minimum 7/16 in. thick oriented strand board (OSB). SIPs shall bear the ESR-1295 listing mark.

3.2. (#2) Splines. *Insulspan Structural Insulated Panels* for use in seismic construction are interconnected with #2 Douglas Fir 4x lumber along the full length of the spline connection.

3.3. (#3) Chords and Top and Bottom Plates. *Insulspan Structural Insulated Panels* for use in seismic construction shall use #2 Douglas Fir Double 4x Top Plate, Chords and Bottom Plate.

3.4. Fasteners. *Insulspan Structural Insulated Panels* shall be fastened in accordance with Figure 1.

3.4.1. (#4) 8d Nails, 0.113 in. x 2-1/2 in. applied 4 in. o.c., 2 rows staggered around the panel perimeter and 4 in. o.c., 2 rows staggered on both sides of the spline connection.

3.4.2. (#5) 10d Nails, 0.131 in. x 3 in. (4) fasteners used to toe nail the top and bottom plates at each chord.

3.5. Hold-downs. Designed in accordance with accepted engineering practice to resist design chord forces.

4. DESIGN

4.1. Design Approval. Where required by the authority having jurisdiction, structures using *Insulspan Structural Insulated Panels* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details, and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation. ^(IM 014 NACU4)

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4.5. Seismic Design Categories. The shear wall configurations in Table 1 are permitted in Seismic Design Categories A, B, C, D, E and F. Such walls shall be designed using the seismic design coefficients and limitations provided in ASCE 7-05 for light-framed walls sheathed with wood structural panels rated for shear resistance (SFRS A13). These SIP panels shall use the following factors for design: Response Modification Coefficient, $R = 6.5$; System Overstrength Factor, $Q_0 = 3.0$; Deflection Amplification Factor, $C_d = 4.0$. ^(IM 014 ACU16)

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**Table 1: Allowable In-Plane Shear Strength (Pounds per Foot)
for SIP Shear Walls (Seismic Loads in Seismic Design Categories A, B, C, D, E and F)^{1,2}**

Spline Type	Framing Minimum SG ⁴	Minimum Facing Connections ²			Shear Strength (plf)
		Chord ²	Plate ²	Spline	
4x #2 Douglas Fir ³	0.50	0.113" x 2-1/2" nails, 4 in. o.c. 2 rows staggered, 3/4 in. and 2-1/4 in. edge distance	0.113" x 2-1/2" nails, 4 in. o.c. 2 rows staggered, 3/4 in. and 2-1/4 in. edge distance	0.113" x 2-1/2" nails, 4 in. o.c. 2 rows staggered, 5/8 in. and 1-1/8 in. edge distance	920

¹Allowable seismic design coefficients are provided in Section 4.5.

²Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.

³The maximum assembly height-to-width ratio shall be 2:1.

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