TECHNICAL BULLETIN NO. D-5

PREMIER SIPS
STRUCTURAL INSULATED PANELS

SUBJECT: SHEAR WALL & DIAPHRAGM CAPACITY OF PREMIER SIPS

Premier SIPS have been evaluated for use as shear walls and diaphragms in structures. Shear wall and diaphragm applications include both wall and roof assemblies that are subjected to seismic or wind loads. Through large and small-scale testing conducted at the APA laboratories, overseen by an independent structural consultant, it was determined that Premier SIPS can develop design diaphragm capacities of up to 1130 PLF. Please refer to the Premier SIPS Load Chart #7A for Premier SIPS Wood Screw and nail spacing required to obtain this capacity.

These tests have allowed for the determination of design capacities for Premier SIPS Wood Screws and nails when used in diaphragms. The following lateral load capacities are recommended:

- Premier SIPS Wood Screws: 250 lbs.
- 8d nails @ surface splines: 62.5 lbs.

DESIGN VALUES INCLUDE A SAFETY FACTOR OF THREE ON THE ULTIMATE LOAD.

In all shear wall and diaphragm applications, the design of the lateral load resisting system must be engineered to provide a load path for the forces that the structure experiences. This is provided by the engineer of record on the specific project.

Current Premier SIPS Load Charts and the Premier SIPS Resource Manual can be found at www.premiersips.com.

LOAD CHART #7A

Roof/Floor Diaphragms Loads - PLF [1, 5] • Type S Spline

Minimum Connections[2]				Allowable Shear Load (PLF)	G' Apparent Shear Stiffness (lbf/in)	Maximum Aspect Ratio
Interior Supports[2] (Figure A)	Spline[3] (Figure B)	Boundary[4] (Figure C)				
		Support	Spline			
0.189∅ PBS SIP Screw with 1" penetration 12" on center	0.113"x 2-1/2" nails, 3" on center 7/16" x 3" OSB Box/Block Spline	0.189∅ PBS SIP Screw with 1" penetration 12" on center	0.113" x 2-1/2" nails, 6" on center	430	24000	4:1
0.189∅ PBS SIP Screw with 1" penetration 12" on center	0.113"x 2-1/2" nails, 3" on center, 2 rows, staggered 7/16" x 3" OSB Box/Block Spline	0.189∅ PBS SIP Screw with 1" penetration 3" on center	0.113" x 2-1/2" nails, 4" on center	460	30300	4:1
0.189∅ PBS SIP Screw with 1" penetration 2" on center	0.113"x 2-1/2" nails, 3" on center, 2 rows, staggered 7/16" x 3" OSB Box/Block Spline	0.189∅ PBS SIP Screw with 1" penetration 2" on center	0.113" x 2-1/2" nails, 1-1/2" on center	655	41300	4:1
0.189∅ PBS SIP Screw with 1" penetration 4" on center	0.113"x 2-1/2" nails, 3" on center, 2 rows, staggered 7/16" x 3" OSB Box/Block Spline	0.189∅ PBS SIP Screw with 1" penetration 4" on center	0.113" x 2-1/2" nails, 3" on center	795	93700	3:1
0.189∅ PBS SIP Screw with 1" penetration 4" on center	0.113"x 2-1/2" nails, 6" on center, 2 rows, staggered 23/32" x 4" OSB Box/Block Spline	0.189∅ PBS SIP Screw with 1" penetration 4" on center	0.113" x 2-1/2" nails, 6" on center	1130	110600	3:1

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

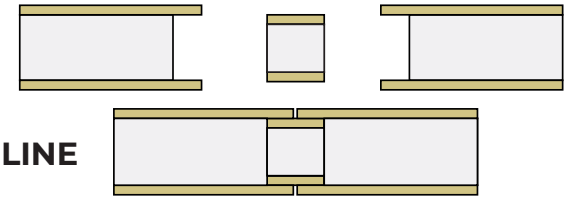
[1] The maximum diaphragm length-to-width ratio shall not exceed 4:1. Load may be applied parallel to continuous panel joints.

[2] Ends of individual panels are required to be supported as required in Tables 1, 3 and 4 of the ESR-4524 code report. Specified fasteners are required on both sides of panel joint where panels are joined over a support. See figure A.

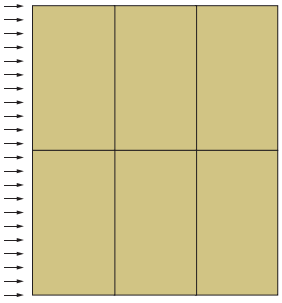
[3] At unsupported interior panel-to-panel joints, specified fasteners are required on the top of the panels on both sides of panel joint. See Figure B.

[4] Boundary spline shall be solid 1 1/2 inches (38.1 mm) wide, minimum, and have a specific gravity of 0.42 or greater. Specified spline fasteners are required through both facings. See Figure C. Ends of individual panels are required to be supported as required in Tables 1, 3 and 4 of the ESR=4524 code report.

[5] Diaphragms shall be specified in accordance with accepted engineering practices.



DIAPHRAGM LOAD



TYPE S SPLINE

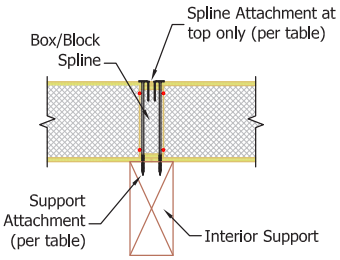


FIGURE A - INTERIOR SUPPORT

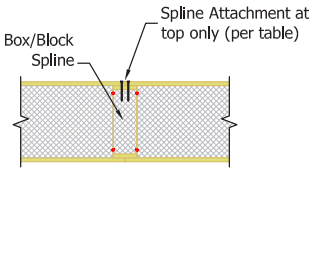


FIGURE B - BOX/BLOCK SPLINE

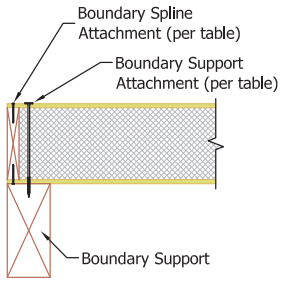


FIGURE C - BOUNDARY

LOAD CHART #4A

Allowable in-plane racking shear strength for Premier SIPS shear walls 4 1/2 through 12 1/4 inch thickness wind and seismic loads in seismic design categories A, B and C[1]

Framing Minimum SG[4]	Minimum Facing Connections[4]			Shear Load (PLF)[5]
	Chord[2, 3]	Plate[2]	Spline[3]	
0.50 (DF #2 OR BTR.)	0.113"x 2-1/2" nails 6" on center	0.113"x 2-1/2" nails 6" on center	(7/16" OSB Faced x 3" wide Box/Block Spline) 0.113"x 2-1 /2" nails, 6" on center	410
0.50 (DF #2 OR BTR.)	0.113"x 2-3/8" nails 6" on center Staggered (2 rows)	0.113"x 2-3/8" nails 6" on center	(7/16" OSB Faced x 3" wide Box/Block Spline) 0.113"x 2-3/8" nails, 6" on center[6]	460
0.42 (SPF #2 OR BTR.)	0.113"x 2-3/8" nails 6" on center Staggered (2 rows)	0.113"x 2-3/8" nails 4" on center Staggered (2 rows)	(7/16" OSB Faced x 3" wide Box/Block Spline) 0.113"x 2-3/8" nails, 4" on center[6]	700
0.42 (SPF #2 OR BTR.)	0.148"x 2-3/8" nails 6" on center Staggered (2 rows)	0.148"x 2-3/8" nails 3" on center	(23/32" OSB Faced x 3" wide Box/Block Spline) 0.148"x 2-3/8" nails, 3" on center stagger (2 rows)[7]	1000

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

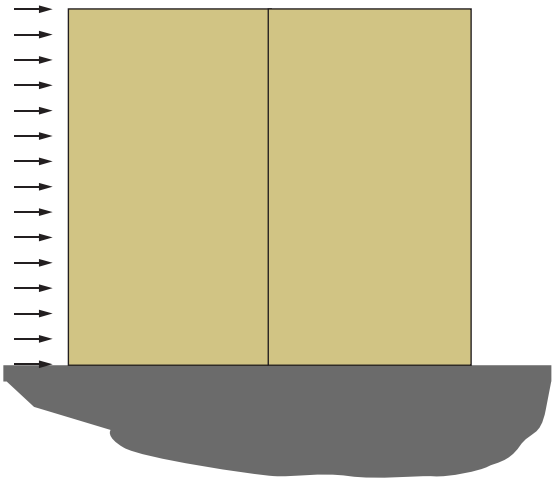
[1] Shear strength values, as published in this table, are limited to assemblies resisting wind or seismic forces when the aspect ratio (height:width) does not exceed 2:1.

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

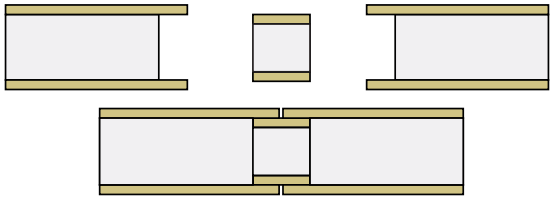
[3] Spline type at interior panel-to panel joints only, solid chord members are required at each end of each shear wall segment.

[4] Required connections must be made on each side of the SIP, exterior and interior. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.5.For design to resist seismic forces, shear wall height-width ratios greater than 2:1, but not exceeding 3.5:1, are permitted for assemblies using lumber splines provided the allowable shear strength values in this table are multiplied by 2w/h.

SHEAR LOAD



TYPE S SPLINE



TYPE L SPLINE