



LP[®] SmartSide[®] Strand Substrate Treated-Engineered-Wood Lap & Panel Siding

PR-N124(M)

Louisiana-Pacific Corporation

Revised December 2, 2016

Product: LP[®] SmartSide[®] Strand Substrate Treated-Engineered-Wood Lap and Panel Siding
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1. Basis of the product report:
 - 2015, 2012 and 2009 International Building Code: Section 104.11 Alternative materials
 - 2015, 2012 and 2009 International Residential Code: Section R104.11 Alternative materials
 - ANSI/AWC SDPWS-2015 Special Design Provisions for Wind and Seismic
 - ASCE 7-10 and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures
 - ICC-ES Acceptance Criteria for Treated-Engineered-Wood Siding, AC321
 - APA PRP-108 Performance Standards and Qualification Policy for Structural-Use Panels
 - NES Evaluation Protocol for Determination of Flood-Resistance Properties of Building Elements
 - APA Reports R&D 87Q-1, T87Q-45, T91Q-11, T91Q-20, T97Q-4, T97Q-10, T98Q-13, T98Q-17, T99Q-23, T2008Q-12, T2008P-73, T2008P-74, T2009Q-54, T2011Q-59, T2012P-22, T2015Q-38, and T2015Q-39, and other qualification data.

2. Product description:

Louisiana-Pacific Corporation (LP[®]) SmartSide[®] Strand Substrate Treated-Engineered-Wood Lap and Panel siding is overlaid with a resin treated paper and is available with either a smooth or embossed surface texture. The siding is available as laps or panels. The siding is treated with Zinc Borate for decay and insect resistance. All edges are factory sealed with a primer.

LP[®] SmartSide[®] Strand Substrate Treated-Engineered-Wood lap siding is available in 3/8 and 7/16 Performance Categories (nominal thicknesses of 9.5 and 11 mm, respectively), in nominal widths of 150, 205, 240, and 305 mm and in lengths up to 4,875 mm.

LP[®] SmartSide[®] Strand Substrate panel siding is available in 3/8, 7/16 and 19/32 Performance Categories (nominal thicknesses of 9.5, 11 and 15 mm, respectively), 1,220 mm width and in lengths of 2,440, 2,745, and 3,050 mm. The 3/8 Performance Category (nominal 9.5 mm) panels are available without grooves or with grooves spaced 205 mm on center. The 7/16 and 19/32 Performance Category (nominal 11 mm and 15 mm, respectively) panels are available without grooves or with grooves spaced either 100 or 205 mm on center. Minimum thicknesses at the groove and shiplap are documented in the plant Quality Manual.

3. Design properties:

Allowable racking loads for LP[®] SmartSide[®] Strand Substrate panel siding are listed in Table 1. For 3/8 Performance Category (nominal 9.5 mm) panels nailed at shiplap edges, use 5/16 Performance Category (nominal 8 mm) shear values. For 7/16 and 19/32 Performance Category (nominal 11 mm and 15 mm, respectively) panel sidings nailed at shiplap edges, use 3/8 Performance Category (nominal 9.5 mm) shear values. Design wind loads LP[®] SmartSide[®] Strand Substrate lap and panel siding are listed in Tables 2 and 3, respectively.

4. Product installation:
LP® SmartSide® Strand Substrate Treated-Engineered-Wood Lap and Panel sidings shall be installed in accordance with recommendations provided by the manufacturer (www.lpcorp.com/products/siding/lp-smartside-trim-siding/) and APA *Engineered Wood Construction Guide*, Form E30 (www.apawood.org/resource-library). The maximum span shall be in accordance with the Span Rating (shown in inches) in the trademark. The LP® SmartSide® Strand Substrate lap siding shall be permitted to be installed over the facer of structural insulated panels (SIPs) in accordance with Table 4.
5. Fire-resistant construction:
Wood structural panels that are not fire-retardant-treated have been shown to meet a Class III (or C) category for flame spread. Unless otherwise specified, fire-resistant construction shall be in accordance with the recommendations in APA *Fire-Rated Systems*, Form W305 (see link above).
6. Flood resistance evaluation:
Selected properties critical to flood resistance of 3/8 and 7/16 Performance Category (nominal 9.5 mm and 11 mm, respectively) panel siding, including uniform loads, concentrated static loads, concentrated hard body and soft body impact loads, fastener performance, wall racking resistance, edge thickness swell, linear expansion, hygroscopicity, exterior bond performance and large panel and small specimen bending properties were evaluated at a 405-mm o.c. span rating in accordance with *NES Evaluation Protocol for Determination of Flood-Resistance Properties of Building Elements*. Test results in the dry (as-received) condition and after moisture cycling in accordance with the NES protocol were compared to the requirements specified in ICC Evaluation Service (ICC-ES) *Acceptance Criteria for Treated-Engineered-Wood Siding (AC321)*.
7. Limitations:
 - a) LP® SmartSide® Strand Substrate Treated-Engineered-Wood Lap and Panel siding used outdoors must be finished in accordance with recommendations provided by the manufacturer (see link above) and APA *Engineered Wood Construction Guide*, Form E30 (see link above).
 - b) LP® SmartSide® Strand Substrate Treated-Engineered-Wood panel siding is flood resistant on the following properties: uniform loads, concentrated static loads, concentrated hard body and soft body impact loads, fastener performance, wall racking resistance, edge thickness swell, linear expansion, hygroscopicity, exterior bond performance and large panel and small specimen bending properties. This evaluation applies to 3/8 and 7/16 Performance Category (nominal 9.5 mm and 11 mm, respectively) panel siding at a 405-mm o.c. span rating.
 - c) LP® SmartSide® Strand Substrate Treated-Engineered-Wood Lap and Panel siding is produced at Louisiana-Pacific Corporation facilities at Hayward, WI, Newberry, MI, Tomahawk, WI, Two Harbors, MN, and Swan Valley, Minitonas, MB under a quality assurance program audited by APA.
 - d) This report is subject to re-examination in one year.
8. Identification:
LP® SmartSide® Strand Substrate Treated-Engineered-Wood Lap and Panel siding described in this report is identified by a label bearing the manufacturer's name (Louisiana-Pacific Corporation) and/or trademark, the APA assigned plant number (357 for the Hayward plant, 416 for the Newberry plant, 435 for the Tomahawk plant, 399 for the Two Harbors plant, or 457 for the Swan Valley plant), the product Performance Category, the Span Rating, the Exposure Rating, the APA logo, the report number PR-N124, and a means of identifying the date of manufacture.

Table 1. Allowable Racking Shear (N/m) for LP® SmartSide® Strand Substrate Treated-Engineered-Wood Panel Siding – Sheathing Shear Walls with Framing of Douglas-Fir-Larch or Southern Pine for Wind or Seismic Loading^(1,2,3)

Performance Category	Minimum Nominal Panel Thickness (mm)	Minimum Nail Penetration In Framing (mm)	Panels Applied Directly to Framing				Panels Applied over 12.5-mm or 16-mm Gypsum Sheathing					
			Nail Size (Common or Galvanized Box)	Nail Spacing at Panel Edges (mm)				Nail Size (Common or Galvanized Box)	Nail Spacing at Panel Edges (mm)			
				150	105	75	50 ⁽⁴⁾		150	105	75	50 ⁽⁴⁾
5/16 ^(5,6)	8	32	6d	2,625	3,940	5,110	6,565	8d	2,625	3,940	5,110	6,565
3/8 ^(5,6)	9.5			2,920	4,380	5,690	7,445		2,920	4,380	5,690	7,445
3/8 ^(5,6)	9.5	38	8d	3,210	4,670	5,985	7,735	10d	3,795	5,545	7,150 ⁽⁴⁾	9,340
7/16 ⁽⁵⁾	11			3,505	5,110	6,565	8,535		3,795	5,545	7,150 ⁽⁴⁾	9,340
19/32 ⁽⁵⁾	15	41	10d	4,960	7,445	9,705 ⁽⁴⁾	12,695	-	-	-	-	-

For imperial units: 1 mm = 0.039 inch, 1 N/m = 0.068 plf.

- ⁽¹⁾ For framing of other species: (a) Find specific gravity for species of lumber in the National Design Specification for Wood Construction (NDS); (b) find shear value from table for nails size; (c) multiply value by 0.82 for species with specific gravity greater than or equal to 0.42 but less than 0.49, or 0.65 for species with specific gravity less than 0.42.
- ⁽²⁾ All panel edges must be backed with 38-mm or wider framing. Panels must be installed with the long dimension oriented in the vertical direction. Space nails 150 mm o.c. along intermediate framing members for 3/8 and 7/16 Performance Category (nominal 9.5 mm and 11 mm, respectively) panels installed on studs spaced 610 mm o.c. For other conditions and panel performance categories, space nails 305 mm o.c. on intermediate supports.
- ⁽³⁾ For shear loads of normal or permanent load duration, the values in the table shall be multiplied by 0.63 or 0.56, respectively.
- ⁽⁴⁾ Framing at panel edges must be 75 mm or wider and nails must be staggered where nails are spaced 50 mm o.c., and where 10d nails having penetration into framing of more than 41 mm are spaced 75 mm or less, o.c. **Exception:** Unless otherwise required, 38-mm framing may be used where full nailing surface is available and nails are staggered.
- ⁽⁵⁾ Except as noted in Footnote 7, panel thickness at point of nailing at panel edges determines applicable shear values, except that 3/8 Performance Category (nominal 9.5 mm) panels nailed at shiplap edges use 5/16 Performance Category (nominal 8 mm) shear values, and 7/16 and 19/32 Performance Category (nominal 11 mm and 15 mm, respectively) panel sidings nailed at shiplap edges use 3/8 Performance Category (nominal 9.5 mm) shear values.
- ⁽⁶⁾ Shiplap edges must be double-nailed; one nail must be placed in the underlap and a second nail must be placed in the overlap at the nail spacing specified for the applicable shear value.
- ⁽⁷⁾ Fasteners must not be installed in panel siding grooves in the field of the panel siding or when the panel siding grooves occur at cut edges of the panel siding.

Table 2a. Lap Siding – **Maximum nominal (allowable) design wind speed, $V_{asd}^{(1)}$**

Performance Category	Minimum Nominal Siding Thickness (mm)	Maximum Wall Stud Spacing ⁽²⁾ (mm)	Siding Width (mm)	Maximum Allowable Wind Pressure (Pa)	Maximum Nominal (Allowable) Wind Speed, $V_{asd}^{(3)}$ (m/s)		
					Wind Exposure Category		
					B	C	D
3/8	9.5	405	150	3,830	76	67	63
			205	3,785	76	67	63
			305	2,395	63	54	49
7/16	11	405	150	3,830	76	67	63
			205	3,640	76	67	58
			305	2,345	63	54	49
		610	150	3,400	76	65	58
			205	2,440	65	54	49
			305	1,530	49	40	40

For imperial units: 1 mm = 0.039 inch, 1 Pa = 0.021 psf, 1 m/s = 2.24 mph.

- ⁽¹⁾ One fastener per stud located 20 mm from the top edge of the siding. Each successive course of lap siding must overlap a minimum of 25 mm. Fastener must have a minimum head diameter of 7.5 mm, a minimum shaft diameter of 2.9 mm and a minimum length of 63.5 mm (8d box nail).
- ⁽²⁾ Wall studs must have a minimum specific gravity of 0.42.
- ⁽³⁾ Three-second-gust; based on wind pressures acting toward and away from building surfaces, at 12.2-m height in Zone 5 with smallest effective area per Chapter 6 of ASCE 7-05, Section R301.2.1 of the 2009 and 2012 IRC, and Section 1609.1.1 of the 2009 IBC.

Table 2b. Lap Siding – **Maximum ultimate design wind speed, $V_{ult}^{(1)}$**

Performance Category	Minimum Nominal Siding Thickness (mm)	Maximum Wall Stud Spacing ⁽²⁾ (mm)	Siding Width (mm)	Maximum Ultimate Wind Pressure (Pa)	Maximum Ultimate Design Wind Speed, $V_{ult}^{(3)}$ (m/s)		
					Wind Exposure Category		
					B	C	D
3/8	9.5	405	150	6,370	89 ⁽⁴⁾	80	80
			205	6,270	89 ⁽⁴⁾	80	80
			305	3,975	80	67	63
7/16	11	405	150	6,370	89 ⁽⁴⁾	80	80
			205	6,080	89 ⁽⁴⁾	80	72
			305	3,880	80	67	63
		610	150	5,700	89 ⁽⁴⁾	80	72
			205	4,070	80	67	63
			305	2,585	63	54	51

For imperial units: 1 mm = 0.039 inch, 1 Pa = 0.021 psf, 1 m/s = 2.24 mph.

- ⁽¹⁾ One fastener per stud located 20 mm from the top edge of the siding. Each successive course of lap siding must overlap a minimum of 25 mm. Fastener must have a minimum head diameter of 7.5 mm, a minimum shaft diameter of 2.9 mm and a minimum length of 63.5 mm (8d box nail).
- ⁽²⁾ Wall studs must have a minimum specific gravity of 0.42.
- ⁽³⁾ Three-second-gust; based on wind pressures acting toward and away from building surfaces, at 12.2-m height in Zone 5 with smallest effective area per Chapter 26 of ASCE 7-10, Section R301.2.1 of the 2015 IRC, and Section 1609.1.1 of the 2012 and 2015 IBC.
- ⁽⁴⁾ Table R301.2(2) of the 2015 IRC is limited to a maximum ultimate design wind speed, V_{ult} , of 180 mph (80 m/s).

Table 3a. Panel Siding – **Maximum nominal (allowable) design wind speed, V_{asd}**

Performance Category	Minimum Nominal Siding Thickness (mm)	Maximum Wall Stud Spacing ⁽²⁾ (mm)	Fastener Spacing ⁽¹⁾ (mm o.c.)		Maximum Allowable Wind Pressure (Pa)	Maximum Nominal (Allowable) Wind Speed, V_{asd} ⁽³⁾ (m/s)		
			Edges	Field		Wind Exposure Category		
						B	C	D
3/8	9.5	405	150	305	2,200	58	49	47
				150	3,830	76	67	63
		610	150	305	1,485	49	40	38
				150	2,920	67	58	54
7/16	11	405	150	305	2,155	58	49	47
				150	3,830	76	67	63
		610	150	305	1,435	49	40	38
				150	2,825	67	58	54
19/32	15	405	150	305	1,965	58	49	45
				150	3,830	76	67	63
		610	150	305	1,295	47	40	--
				150	2,635	67	56	49

For **imperial units**: 1 mm = 0.039 inch, 1 Pa = 0.021 psf, 1 m/s = 2.24 mph.

- (1) Fastener must have a minimum head diameter of 7.5 mm, a minimum shaft diameter of 2.9 mm and a minimum length of 63.5 mm (8d box nail).
- (2) Wall studs must have a minimum specific gravity of 0.42.
- (3) Three-second-gust; based on wind pressures acting toward and away from building surfaces, at 12.2-mm height in Zone 5 with smallest effective area per Chapter 6 of ASCE 7-05, Section R301.2.1 of the 2009 and 2012 IRC, and Section 1609.1.1 of the 2009 IBC.

Table 3b. Panel Siding – **Maximum ultimate design wind speed, V_{ult}**

Performance Category	Minimum Nominal Siding Thickness (mm)	Maximum Wall Stud Spacing ⁽²⁾ (mm)	Fastener Spacing ⁽¹⁾ (mm o.c.)		Maximum Ultimate Wind Pressure (Pa)	Maximum Ultimate Design Wind Speed, V_{ult} ⁽³⁾ (m/s)		
			Edges	Field		Wind Exposure Category		
						B	C	D
3/8	9.5	405	150	305	3,685	72	67	58
				150	6,370	89 ⁽⁴⁾	80	80
		610	150	305	2,440	63	54	49
				150	4,885	89 ⁽⁴⁾	72	67
7/16	11	405	150	305	3,545	72	63	58
				150	6,370	89 ⁽⁴⁾	80	80
		610	150	305	2,395	63	54	49
				150	4,740	89 ⁽⁴⁾	72	67
19/32	15	405	150	305	3,305	72	63	58
				150	6,370	89 ⁽⁴⁾	80	80
		610	150	305	2,200	58	51	--
				150	4,405	80	72	67

For **imperial units**: 1 mm = 0.039 inch, 1 Pa = 0.021 psf, 1 m/s = 2.24 mph.

- (1) Fastener must have a minimum head diameter of 7.5 mm, a minimum shaft diameter of 2.9 mm and a minimum length of 63.5 mm (8d box nail).
- (2) Wall studs must have a minimum specific gravity of 0.42.
- (3) Three-second-gust; based on wind pressures acting toward and away from building surfaces, at 12.2-mm height in Zone 5 with smallest effective area per Chapter 26 of ASCE 7-10, Section R301.2.1 of the 2015 IRC, and Section 1609.1.1 of the 2012 and 2015 IBC.
- (4) Table R301.2(2) of the 2015 IRC is limited to a maximum ultimate design wind speed, V_{ult} , of 180 mph (80 m/s).

Table 4a. Lap Siding Installed Over the Facer of SIPs⁽¹⁾ – **Maximum nominal (allowable) design wind speed, V_{asd} ⁽²⁾**

Performance Category	Minimum Nominal Siding Thickness (mm)	Maximum Ring Shank Nail Spacing ⁽³⁾ (mm)	Maximum Wood Screw Spacing ⁽⁴⁾ (mm)	Siding Width (mm)	Maximum Allowable Wind Pressure (Pa)	Maximum Nominal (Allowable) Wind Speed, V_{asd} ⁽⁵⁾ (m/s)		
						Wind Exposure Category		
						B	C	D
3/8	9.5	205	305	150	3,830	76	67	63
				205	3,015	67	58	56
				305	1,915	56	47	40
7/16	11	305	405	150	2,775	67	58	54
				205	2,010	58	49	45
				305	1,295	47	38	-

For imperial units: 1 mm = 0.039 inch, 1 Pa = 0.021 psf, 1 m/s = 2.24 mph.

- (1) The facer of the structural insulated panels (SIPs) shall be 7/16 Performance Category (nominal 11 mm) or thicker OSB sheathing meeting DOC PS2 requirements.
- (2) The tabulated values represent the capacity of the LP Lap Siding installed in accordance with the requirements of this table. **The tabulated wind speed shall not exceed the SIP capacity for wind load resistance.**
- (3) One 6d ring shank nail (3 mm in diameter) located 12.5 mm from the top edge of the siding. The ring shank nails must have a minimum head diameter of 7.5 mm, a minimum shank diameter of 3 mm and a minimum length of 51 mm.
- (4) One #8 wood screw (4.2 mm in diameter) located 12.5 mm from the top edge of the siding may be used. The wood screws must have a minimum head diameter of 7.5 mm, a minimum shank diameter of 4.2 mm and a minimum length of 51 mm.
- (5) Three-second-gust; based on wind pressures acting toward and away from building surfaces, at 12.2-mm height in Zone 5 with smallest effective area per Chapter 6 of ASCE 7-05, Section R301.2.1 of the 2009 and 2012 IRC, and Section 1609.1.1 of the 2009 IBC.

Table 4b. Lap Siding Installed Over the Facer of SIPs⁽¹⁾ – **Maximum ultimate design wind speed, V_{ult} ⁽²⁾**

Performance Category	Minimum Siding Thickness (mm)	Maximum Ring Shank Nail Spacing ⁽³⁾ (mm)	Maximum Wood Screw Spacing ⁽⁴⁾ (m)	Siding Width (mm)	Maximum Ultimate Wind Pressure (Pa)	Maximum Ultimate Design Wind Speed, V_{ult} ⁽⁵⁾ (m/s)		
						Wind Exposure Category		
						B	C	D
3/8	9.5	205	305	150	6,370	89 ⁽⁶⁾	80	80
				205	5,025	89 ⁽⁶⁾	72	72
				305	3,210	72	63	54
7/16	11	305	405	150	4,645	89 ⁽⁶⁾	72	67
				205	3,350	72	63	58
				305	2,155	58	51	-

For imperial units: 1 mm = 0.039 inch, 1 Pa = 0.021 psf, 1 m/s = 2.24 mph.

- (1) The facer of the structural insulated panels (SIPs) shall be 7/16 Performance Category (nominal 11 mm) or thicker OSB sheathing meeting DOC PS2 requirements.
- (2) The tabulated values represent the capacity of the LP Lap Siding installed in accordance with the requirements of this table. **The tabulated wind speed shall not exceed the SIP capacity for wind load resistance.**
- (3) One 6d ring shank nail (3 mm in diameter) located 12.5 mm from the top edge of the siding. The ring shank nails must have a minimum head diameter of 7.5 mm, a minimum shank diameter of 3 mm and a minimum length of 51 mm.
- (4) One #8 wood screw (4.2 mm in diameter) located 12.5 mm from the top edge of the siding may be used. The wood screws must have a minimum head diameter of 7.5 mm, a minimum shank diameter of 4.2 mm and a minimum length of 51 mm.
- (5) Three-second-gust; based on wind pressures acting toward and away from building surfaces, at 12.2-mm height in Zone 5 with smallest effective area per Chapter 26 of ASCE 7-10, Section R301.2.1 of the 2015 IRC, and Section 1609.1.1 of the 2012 and 2015 IBC.
- (6) Table R301.2(2) of the 2015 IRC is limited to a maximum ultimate design wind speed, V_{ult} , of 180 mph (80 m/s).

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