APA PRODUCT REPORT®

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Shelton Lock-Deck Laminated Decking — PR-L322
Shelton Structures Inc.
DBA Shelton Lam and Deck

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Products: Shelton Lock-Deck Laminated Decking
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1. Basis of the product report:
   - 2021, 2018, 2015, and 2012 International Building Code (IBC): Sections 104.11 Alternative materials and 2303.1.3 Structural glued-laminated timber
   - 2021, 2018, and 2015 International Residential Code (IRC): Sections R104.11 Alternative materials, and R502.1.3, R602.1.3, and R802.1.2 Structural glued-laminated timber
   - 2012 IRC: Sections R104.11 Alternative materials, and R502.1.5, R602.1.2, and R802.1.4 Structural glued-laminated timber
   - ANSI A190.1-2017, ANSI A190.1-2012, and ANSI/AITC A190.1-2007 recognized in the 2021 and 2018 IBC and IRC, 2015 IBC and IRC, and 2012 IBC and IRC, respectively
   - ASTM D3737-18e1, D3737-12, and D3737-08 recognized in the 2021 IBC and IRC, 2018 and 2015 IBC and IRC, and 2012 IBC and IRC, respectively
   - AITC 112-93 Standard for Tongue-and-Groove Heavy Timber Roof Decking
   - Lamination and decking test data

2. Product description:
   Shelton Lock-Deck Laminated Decking is a glued-laminated decking manufactured in accordance with manufacturing specifications approved by APA. The decking is manufactured in accordance with Shelton Lam & Deck's in-plant manufacturing standard approved by APA. The adhesives used to manufacture the decking are exterior-type adhesives meeting the requirements of ASTM D2559 and ANSI 405. The decking is manufactured in nominal thicknesses ranging from 3 to 5 inches in accordance with Table 1.

   Shelton Lock-Deck Laminated Decking is manufactured from a single species or combination of species listed in Table 2. The lamination is kiln-dried and surfaced prior to grading by a certified lumber grader. Shelton Lock-Deck Laminated Decking shall be made of 3 or more plies of laminations, which shall be offset 3/4 inch to form a tongue-and-groove interlocking effect along the sides and ends of the individual deck planks.

   Spacing of structural end joints in adjacent laminations is not restricted. Butting of ends in inner laminations is permitted provided the approved joints in the face lamination are staggered a minimum of 6 inches. Only unglued joints in the core shall be spaced a minimum of 3 inches from another unglued or approved core joint and from the maximum permitted strength-reducing characteristics.

3. Design properties:
   Design bending capacities of Shelton Lock-Deck Laminated Decking shall be permitted to be determined by multiplying the section properties of the decking shown in Table 1 by the allowable bending properties of the plank provided in Table 2. For Shelton Lock-Deck Laminated Decking rated at the modulus of elasticity of 1.8×10^6 psi (Doulas fir or Western larch), one core lamination of Douglas fir with the modulus of elasticity of 1.5×10^6 psi shall be permitted.

For Shelton Lock-Deck Laminated Decking used in random-length continuous (RLC) layup framing, only 2/3 of the net section modulus shown in Table 1 shall be considered effective in calculating the moment capacities.

Allowable total roof loads for 3-inch, 4-inch, and 5-inch-thick Shelton Lock-Deck Laminated Decking are provided in Table 3.

4. Product installation:
Shelton Lock-Deck Laminated Decking shall be installed in accordance with the recommendations provided by the manufacturer or the requirements specified in this section, whichever is more stringent.
   a) Each decking plank shall be nailed with two nails to each support, using 20-penny common (0.192 inch x 4 inches) nails for the 3-inch-thick, 30-penny common (0.207 inch x 4-1/2 inches) nails for the 3-inch super-thick and 4-inch-thick, and 50-penny common (0.244 inch x 5-1/2 inches) nails for the 5-inch-thick decks.
   b) Each course of the decking shall be secured by slant-face nailing to the adjacent courses with 8-penny common (0.131 inch x 2-1/2 inches) nails for the 3-inch decks and 16-penny common (0.162 inch x 3-1/2 inches) nails for the 4-inch and 5-inch decks.
   c) The nails shall be spaced at 30 inches on center, with nailing in alternate courses offset 15 inches. Additional nailing shall be required where the regularly spaced nails do not provide a nail within 12 inches of each side of each end joint.
   d) **Special requirements for simple and two-span framing**:
      1) All end joints shall occur on supports; and
      2) All 2-span framing shall be full-length planks with no end joints permitted.
   e) **Special requirements for controlled random-length layup framing**:
      1) The distance between end joints in adjacent courses of decking shall be at least 2 feet;
      2) End joints in rows not directly adjacent to one another shall be separated by one course of decking and 1 foot measured along the axis of the plank, or by two continuous curses of decking;
      3) Within a 1-foot section of decking, the number of end joints shall not exceed 1/3 of the total number of decking courses;
      4) Each decking plank shall rest on at least one support;
      5) There shall be only 1 end joint in each course between supports, and a joint on a support shall be considered as a joint in either of the adjacent spans;
      6) In end spans, 1/3 of all courses of decking shall be free of end joints, except where overhangs of 1/5 of the normal end span or greater occur, or where end spans are shortened to achieve a deflection comparable to an interior span; and
      7) Joints shall be end-matched.

5. Fire-rated assemblies:
Design of fire-resistant exposed wood members in accordance with Chapter 16 of the National Design Specification for Wood Construction (NDS), Section 722.1 of the 2021, 2018, and 2015 IBC, or Section 722.6.3 of the 2012 IBC shall be applicable to Shelton Lock-Deck Laminated Decking.

6. Limitations:
   a) Shelton Lock-Deck Laminated Decking shall be designed in accordance with the code using the design properties or allowable total roof load table provided in this report.
   b) Shelton Lock-Deck Laminated Decking shall not be used as a floor sheathing or as a support for plaster ceiling unless deflection is limited by the code.
   c) Shelton Lock-Deck Laminated Decking when used as a floor sheathing shall be provided with a flooring or an underlayment complying with the code.
   d) Shelton Lock-Deck Laminated Decking is produced at the Shelton Structures Inc. dba Shelton Lam and Deck, Chehalis, WA facility under a quality assurance program audited by APA.

e) This report is subject to re-examination in one year.

7. Identification:
Shelton Lock-Deck Laminated Decking described in this report is identified by a label bearing the manufacturer's name (Shelton Lam & Deck) and/or trademark, the APA assigned plant number (1049), the product standard (ANSI A190.1), the APA logo, the combination symbol, the report number PR-L322, and a means of identifying the date of manufacture.

Table 1. Designations and sizes of Shelton Lock-Deck Laminated Decking

Designation of Decking[a]	Number of Lamina-tions	Approx. Net Thickness of Laminations (in.)			Net Finish Thickness (in.)	Sectional Properties		
		Face	Center	Back		Area (in.^{2} per foot of decking width)	Moment of Inertia (in.^{4} per foot of decking width)	Section Modulus (in.^{3} per foot of decking width)
3-inch	3	3/4	3/4	3/4	2-3/16	25.88	10.29	9.39
3-inch superthick	3	3/4	1-1/4	3/4	2-21/32	31.61	17.57	13.70
3-inch superthick	4	1-1/4[b]	3/4	3/4	2-21/32	31.61	17.57	13.70
4-inch	3	3/4	1-3/8	3/4	2-7/8	33.95	23.44	16.30
4-inch	3	3/4	1-1/2	3/4	3	35.70	27.02	18.11
5-inch	5	3/4	3-3/4	3/4	3-21/32	43.13	48.04	26.26

[a] Net decking plank widths are 5-1/4, 7, 9, and 11 inches for any designation of decking.
[b] The plank “face” consists of a resawn board of face-grade quality directly laminated to a 3/4-inch board of back grade quality.

Table 2. Bending properties[a] of individual planks

Species	Western Red Cedar	Engelmann Spruce[b], Ponderosa Pine, Idaho White Pine, and Hem-fir	Douglas fir (Coast or Inland North) and Western larch
Bending modulus of elasticity, E (psi)	1.2×10^6	1.5×10^6	1.8×10^6
Allowable bending stress, F_b (psi)	1,200	1,400	2,000

[a] Properties are based on 12% moisture content and normal duration of load. Adjustments for other load duration, moisture condition, and repetitive member use shall be permitted in accordance with the applicable codes.
[b] Grown in Idaho north of the Salmon River.

Table 3. Total allowable roof loads (psf)[a,b]

Lamination Properties[c]	Span (ft)	3-Inch-Thick[d]				4-Inch-Thick				5-Inch-Thick			
		Simple Span		RLC[e]		Simple Span		RLC[e]		Simple Span		RLC[e]	
		1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240
$E = 1.2 \times 10^6$ psi and F_b = 1,200 psi	6	169	127	23 (F)	192	385	289	400 (S)	400 (S)	773 (S)	592	645 (S)	645 (s)
	7	107	80	161	121	242	182	294 (S)	275	498	374	473 (S)	473 (S)
	8	71	54	108	81	163	122	225 (S)	184	334	250	362 (S)	362 (S)
	9	50	38	76	57	114	86	173	130	234	176	286 (S)	265 (S)
	10	37	27	55	41	83	63	126	94	171	128	258	193
	11	27	21	42	31	63	47	95	71	128	96	194	145
	12	21	16	32	24	48	36	73	55	99	74	149	112
	13	17	12	25	19	38	28	57	43	78	58	117	88
	14			20	15	30	23	46	34	62	47	94	71
	15					25	19	37	28	51	38	76	57
	16							31	23	42	31	63	47
	17							26	19	35	26	53	39
	18									29	22	44	33
$E = 1.5 \times 10^6$ psi and F_b = 1,400 psi	9	63	47	95	71	143	107	207 (S)	162	213	160	333 (S)	332
	10	46	34	69	52	104	78	157	118	160	120	270 (S)	242
	11	34	26	52	39	78	59	118	89	124	93	223 (S)	182
	12	26	20	40	30	60	45	91	68	97	73	187	140
	13	21	16	31	24	47	36	72	54	78	58	147	110
	14			25	19	38	28	57	43	63	47	118	88
	15			20	15	31	23	47	35	63	47	96	72
	16					25	19	38	29	52	39	79	59
	17					21	16	32	24	43	33	66	49
	18							27	20	37	27	55	41
	19							23	17	31	23	47	35

(Footnotes on the following page)

Table 3. Total allowable roof loads (psf)[a,b] (Continued)

Lamination Properties[c]	Span (ft)	3-Inch-Thick[d]				4-Inch-Thick				5-Inch-Thick			
		Simple Span		RLC[e]		Simple Span		RLC[e]		Simple Span		RLC[e]	
		1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240
$E = 1.8 \times 10^6$ psi and F_b = 2,000 psi	9	75	56	114	85	171	129	259	194	351	264	476 (S)	398
	10	55	41	83	62	125	94	189	142	256	192	385 (S)	290
	11	41	31	62	47	94	70	142	106	192	144	291	218
	12	32	24	48	36	72	54	109	82	148	111	224	168
	13	25	19	38	78	57	43	86	64	117	87	176	132
	14			30	23	46	34	69	52	93	70	141	106
	15			25	18	37	28	56	42	76	57	115	86
	16			20	15	31	23	46	35	63	47	94	71
	17					25	19	38	29	52	39	79	59
	18							32	24	44	33	66	50
	19							28	21	37	28	56	42
	20							24	18	32	24	48	36

[a] Allowable total roof load in pounds per square foot under dry service conditions, duration of load of 1.15 (roof snow load), and repetitive member use of 1.15.
[b] Allowable total roof loads are governed by deflection except for those loads labeled with "(S)", which are governed by the allowable bending stress.
[c] Based on dry service conditions and normal duration of load.
[d] Based on 2-3/16-inch net finish thickness.
[e] Random-length continuous layup frame.

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