PRODUCT REPORT®
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Roseburg RigidLam® LVL and RigidRim® LVL Rimboard

PR-L289(C)

Roseburg Forest Products Company

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Products: RigidLam® LVL and RigidRim® LVL Rimboard
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1. Basis of the product report:
   - 2020 National Building Code of Canada (NBC): Clause 1.2.1.1 of Division A and Clauses 4.1, 4.3.1.1, and 9.23 of Division B
   - CSA O86-19 Engineering Design in Wood recognized in the 2020 NBC
   - ASTM D5456-18 recognized in CSA O86-19
   - ASTM D7672-19 Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies
   - APA Reports T2000P-19, T2000P-30, T2001P-11, T2001P-15, T2001P-22, T2001M-81, T2001M-87, T2003P-16, T2003P-33, T2003P-42A, T2003P-49A, T2004P-8, T2005P-50, T2007P-24, T2007P-25A, T2007P-26A, T2007P-30, T2007P-32, T2007P-101, T2010P-27, T2010P-31, T2010P-32, T2011P-34A, T2011P-35, T2014P-23, T2015P-06, T2016P-32, T2017P-17, T2018P-01, T2019P-13, T2019P-15, T2019P-42, T2019P-49, T2020P-28, T2021P-53, and T2023P-24, and other qualification data

2. Product description:
   Roseburg RigidLam® laminated veneer lumber (LVL) is a structural composite lumber product consisting of either Douglas-fir (DF) or Southern pine (SP) veneers laminated with grain parallel to the length of the member in accordance with the in-plant manufacturing standard approved by APA. Roseburg RigidLam DF LVL is available in thicknesses of 32 to 178 mm (1-1/4 to 7 inches), depths of 89 to 1,219 mm (3-1/2 to 48 inches), and lengths up to 20 m (66 feet). RigidLam DF LVL thicknesses greater than 64 mm (2-1/2 inches) are fabricated by means of a secondary face-bonding process. Roseburg RigidLam SP LVL is available in thicknesses of 32 to 140 mm (1-1/4 to 5-1/2 inches), depths of 89 to 610 mm (3-1/2 to 24 inches), and lengths up to 20 m (66 feet).

   Roseburg RigidLam LVL studs are made of DF veneers only and are used as Part 9 wall framing in accordance with Clause 9.23.10 of the 2020 NBC and in Part 4 engineered wall systems subjected to limitations specified in this report. The minimum thickness of the LVL studs is 38 mm (1-1/2 inches). The LVL studs described in this report are either 1.6E or 2.1E grade DF LVL.

   Roseburg RigidRim® LVL Rimboard is made of DF veneers only. The RigidRim LVL Rimboard described in this report is 1.4E grade LVL and is available in thicknesses of 38 to 89 mm (1-1/2 to 3-1/2 inches). The 89-mm (3-1/2-inch) LVL rim board is face-bonded from 44-mm (1-3/4-inch) thick DF LVL products.

3. Design properties:
   The structural design provisions for wood construction provided in the building code are applicable to Roseburg RigidLam LVL, RigidLam LVL studs, and RigidRim LVL Rimboard, unless noted otherwise in this report. Table 1 lists the Limit States Design (LSD) properties, and Table 2 lists the equivalent relative density (G) for connection design.

3.1 Beams, headers, and Rim board:
   The allowable spans for Roseburg RigidLam LVL and RigidRim LVL Rimboard shall be in accordance with the recommendations provided by the manufacturer (www.roseburg.com).

Table 3 lists the factored resistances and prescribed nail size and spacing for RigidRim LVL Rimboard, and Table 4 shows the minimum nail spacing for Roseburg RigidLam LVL.

3.2 Wall framing:
Roseburg RigidLam DF LVL shall be permitted for use as wall studs in accordance with the prescriptive requirements of Part 9 of the 2020 NBC. The specified shear strength for nailed structural panel shear walls utilizing Roseburg RigidLam DF LVL shall be determined in accordance with Clause 11.3 of CSA O86 utilizing the equivalent relative density specified in Table 2.

3.2.1 Part 9 Prescriptive Stud Wall Applications:
Roseburg RigidLam DF LVL used as studs is permitted in accordance with Clause 9.23.10 of the 2020 NBC, the conditions specified in Section 4.2 of this report, and the following requirements:

a) Braced wall panels utilizing Roseburg RigidLam DF LVL studs are subject to the limitations in Clause 9.23.1.1 of the 2020 NBC, as applicable,
b) Fasteners for sheathing shall conform to Tables 9.23.3.5.-A and 9.23.3.5.-B of the 2020 NBC,
c) Roseburg RigidLam DF LVL stud size and spacing shall conform to Table 9.23.10.1 of the 2020 NBC, and
d) Roseburg RigidLam DF LVL stud-braced walls shall be detailed in accordance with Clause 9.23.13 of the 2020 NBC and Section 4.2 of this report.

3.2.2 Part 4 Engineered Stud Wall Applications:
Roseburg RigidLam DF LVL used as studs shall be permitted when designed in accordance with Clause 4.3.1 of the 2020 NBC, the recommendations provided by the manufacturer (see link above), the conditions specified in Section 4.2 of this report, and the following requirements:

a) Blocked shear walls with Roseburg RigidLam DF LVL studs can be used as lateral load resisting systems in wood construction in Canada with no height limitation. Unblocked shear walls are limited to a height of 4.9 m (16 feet) in accordance with Clause 11.4.4 of CSA O86-19.
b) Blocked shear walls shall be used in high seismic zones (i.e., SC3 and SC4 in Part 4, and $S_a(0.2) \geq 0.7$ in Part 9 of the 2020 NBC).
c) For double-sided walls:
    1) Roseburg RigidLam DF LVL studs shall be a minimum nominal 2x6 for connections with 8d nails and a minimum nominal 2x8 for connections with 10d nails at any nail spacing of less than 100 mm (4 inches).
    2) Stud size and sheathing attachment shall be in accordance with Clause 11.5.3.5 of CSA O86-19.
d) The nail diameter for sheathing-to-framing connections in any wall shall not exceed 3.8 mm (0.148 inch).
e) The nail spacing in any case shall be equal to or greater than 76 mm (3 inches).
f) The size of the nail heads shall meet the requirement specified in CSA B111 or ASTM F1667.
g) Maximum sheathing thickness shall not exceed 15.8 mm (5/8 inch).
h) The stud spacing shall not exceed 610 mm (24 inches) on center.
i) The 64-mm (2.5-inch) stud or double 38-mm (1.5-inch) stud requirements outlined in Clause 11.3.2 of CSA O86-19 shall be applied. The double wall studs shall be constructed by joining single studs by a sufficient number of either nails or screws. The connection between plies shall be designed with mechanical fasteners to resist the shear force at the stud interface and to prevent separation of the studs.

4. Product installation:

4.1 Beams, headers, and rim board:
Roseburg RigidLam LVL shall be installed in accordance with the recommendations provided by the manufacturer (see link above). Permissible details and allowable hole sizes shall be in accordance with the recommendations provided by the manufacturer.

4.2 Wall framing:

4.2.1 Part 9 Prescriptive Stud Wall Applications:
Cutting, notching, and boring of Roseburg RigidLam DF LVL used as studs is permitted in accordance with Clause 9.23.5.3 of the 2020 NBC with the exception that the notch shall not exceed 25% of the stud depth. Stud wall nailing restrictions and requirements are presented in Section 4.2.3 of this report.

4.2.2 Part 4 Engineered Stud Wall Applications:
Design for cutting, notching, and boring of Roseburg RigidLam DF LVL shall be based on the recommendations provided by the manufacturer (see link above), a net section analysis in accordance with the provisions of CSA O86, and the following:

a) Hole size shall not exceed 40% of the LVL stud depth.
b) The factored resistance for bending and/or for tension is reduced by 30%.
c) The edge distance for holes shall have a minimum clear distance of 16 mm (5/8 inch) for LVL stud depth of 140 mm (5-1/2 inches) and less. For larger LVL studs, the minimum edge distance shall be 12% of the LVL stud depth.
d) Notch depth shall not exceed 25% of the LVL stud depth. The notch length shall not exceed 203 mm (8 inches).
e) Holes or notches shall not be placed within 152 mm (6 inches) of either end of the LVL stud.
f) Holes and notches shall not be placed in the same cross-section. A clear vertical separation of at least twice the length of the notch or twice the diameter of the hole shall be maintained, whichever is greater.
g) LVL stud wall nailing restrictions and requirements are prescribed in Section 4.2.3 of this report.

4.2.3 Roseburg RigidLam DF LVL Stud wall nailing restrictions and requirements:

a) For sheathing attached with 3.8 mm x 76 mm nails (10d common: 0.148 inch x 3 inches) or smaller, spaced no closer than 152 mm (6 inches) on center, a single LVL stud shall be permitted for framing at adjoining panel edges.
b) For sheathing attached with 3.3 mm x 64 mm nails (8d common: 0.131 inch x 2-1/2 inches) or 3.8 mm x 76 mm nails (10d common: 0.148 inch x 3 inches) spaced closer than 152 mm (6 inches) on center, a double LVL stud is required at adjoining panel edges. Double LVL studs must be stitch-nailed together using a minimum of the same size and frequency of the nailing required to attach the sheathing to the framing at the panel edges. Panel-edge nails must be installed a minimum of 10 mm (3/8 inch) from the panel edges and must be staggered a minimum of 13 mm (1/2 inch) within each line of nails.
c) For sheathing attached with 3.3 mm x 64 mm nails (8d common: 0.131 inch x 2-1/2 inches) spaced closer than 102 mm (4 inches) on center or 3.8 mm x 76 mm nails (10d common: 0.148 inch x 3 inches) spaced closer than 152 mm (6 inches) on center, a double, stitch-nailed, LVL stud or single 64 mm (2-1/2 inch) thick LVL stud is required at adjoining panel edges. Nails shall be installed a minimum of 10 mm (3/8 inch) from all panel edges and shall be staggered a minimum of 6 mm (1/4 inch) for each row of nails.
d) For Part 9 Prescriptive Stud Wall Applications: Double LVL studs shall be stitch-nailed together with 2 staggered rows of nails [minimum 3.8 mm x 76 mm nails (10d common: 0.148 inch x 3 inches)] spaced 203 mm (8 inches) in each row.

e) For Part 4 Engineered Stud Wall Applications: The stitch nailing of double LVL studs shall be designed to transfer the required lateral shear using an equivalent relative density of 0.50.
f) Nails into the edge of LVL studs shall not be spaced closer than 76 mm (3 inches) on center.
g) Maximum nail size is 3.8 mm x 76 mm (10d common: 0.148 inch x 3 inches).

5. Fire-rated assemblies:
Fire-rated assemblies for Roseburg RigidLam LVL and RigidRim LVL shall be constructed in accordance with the recommendations provided by the manufacturer and approved by the authority having jurisdiction (AHJ), and the following requirements in engineered stud wall applications:
a) The applied factored compressive resistance parallel to grain, ϕf_c, shall not exceed 3.2 MPa (466 psi) for 1.6E, and 4.3 MPa (623 psi) for 2.1E Roseburg RigidLam DF LVL studs.
b) When the slenderness ratio, C_C, exceeds 33, the factored compressive resistance parallel to grain, ϕf_c, determined in accordance with Clause 15.3.3.4 of CSA O86-19, shall be multiplied by 0.66 for Roseburg RigidLam DF LVL studs.

6. Limitations:
a) Roseburg RigidLam LVL, RigidRim LVL Rimboard, and RigidLam DF LVL studs shall be designed in accordance with the code using the design properties specified in this report.
b) Roseburg RigidLam LVL, RigidRim LVL Rimboard, and RigidLam DF LVL studs are limited to dry service conditions, as defined in CSA O86, at which the average equilibrium moisture content of solid-sawn lumber over a year is 15% or less and does not exceed 19%.
c) Roseburg RigidLam DF LVL (all grades), RigidRim DF LVL Rimboard, and RigidLam DF LVL studs are produced at Roseburg Forest Products' facility in Riddle, OR. Roseburg RigidLam DF LVL (3100Fb-2.0E apparent and 2250Fb-1.5E apparent) and Roseburg RigidLam SP LVL are produced at Roseburg Forest Products' facility in Chester, SC.
d) Roseburg RigidLam LVL, RigidLam LVL studs, and RigidRim LVL Rimboard are under a quality assurance program audited by APA.
e) This report is subject to re-examination in one year.

7. Identification:
The Roseburg RigidLam LVL, RigidLam LVL studs, and RigidRim LVL Rimboard described in this report are identified by a label bearing the company name, the product name, the product grade, the APA assigned plant number (1055 for Riddle, OR and 1125 for Chester, SC), the APA logo, the report number PR-L289 or PR-L289C, and a means of identifying the date of manufacture. The RigidLam product name shall be permitted to be labelled as "onCENTER®."

Table 1. LSD Specified Strengths and MOE for Roseburg RigidLam LVL and 1.4E RigidRim LVL Rimboard[a,b]

True E		Apparent E		Flexural Stress, F_b, MPa (psi)		Tension Parallel to Grain, F_t, MPa (psi)[g]	Comp. Parallel to Grain, F_c, MPa (psi)	Compression Perpendicular to Grain, $F_{c\perp}$, MPa (psi)		Horizontal Shear, F_v, MPa (psi)	
Product Grade	E_{true}, MPa (10^6 psi)[c]	Product Grade	$E_{apparent}$, MPa (10^6 psi)[d]	Beam[e]	Plank[f]			Beam	Plank[h]	Beam	Plank
1.4E[i]	9,650 (1.4)	1.3E[i]	8,960 (1.3)	28.67 (4,158)	26.71 (3,875)	19.11 (2,772)	21.46 (3,112)	7.03 (1,019)	8.11 (1,177)	2.56 (372)	1.37 (198)
1.6E	11,030 (1.6)	1.5E	10,340 (1.5)	28.67 (4,158)	28.02 (4,064)	19.11 (2,772)	21.46 (3,112)	7.22 (1,047)	8.11 (1,777)	2.82 (409)	1.37 (198)
2.1E	14,480 (2.1)	2.0E	13,790 (2.0)	39.50 (5,729)	34.56 (5,013)	26.76 (3,881)	33.01 (4,788)	9.41 (1,365)	8.11 (1,777)	3.72 (539)	1.54 (223)
2.3E[i]	15,860 (2.3)	2.2E[i]	15,170 (2.2)	39.50 (5,729)	39.50 (5,729)	26.76 (3,881)	33.01 (4,788)	9.41 (1,365)	8.11 (1,177)	3.72 (539)	1.52 (221)
2.4E[i]	16,550 (2.4)	--	--	43.32 (6,283)	43.32 (6,283)	30.90 (4,481)	35.21 (5,107)	10.67 (1,547)	8.11 (1,177)	4.16 (604)	1.52 (221)

[a] Design values provided in this table are based on covered, dry conditions of use, as defined in CSA O86, for the standard-term load duration. All values, except for E and $F_{c\perp}$, are permitted to be adjusted for other load durations as permitted by the code.

[b] Beam (edgewise) = load parallel to glueline; plank (flatwise) = load perpendicular to glueline.

[c] The tabulated MOE values are the shear-free modulus of elasticity. When calculating deflection, both bending and shear deflections must be included. The deflection equation for a simple-span beam under uniform load is:

In Metric Units: $\delta = \frac{156.3wL^4}{E_{true}bd^3} \times 10^6 + \frac{2400wL^2}{E_{true}bd}$

Where: δ = estimated deflection, mm; w = uniform load, N/m; L = span, m; E = modulus of elasticity, MPa; b = beam width, mm, and; d = beam depth, mm

or

In Imperial Units: $\delta = \frac{270wL^4}{E_{true}bd^3} + \frac{28.8wL^2}{E_{true}bd}$

Where: δ = estimated deflection, inches; w = uniform load, plf; L = span, feet; E = tabulated modulus of elasticity, psi; b = beam width, inches, and; d = beam depth, inches

[d] The tabulated MOE values are the apparent modulus of elasticity and include the effects of shear deflection. When calculating deflection, only the bending deflection needs to be included. The deflection equation for a simple-span beam under uniform load is:

In Metric Units: $\delta = \frac{156.3wL^4}{E_{apparent}bd^3} \times 10^6$

Where: δ = estimated deflection, mm; w = uniform load, N/m
L = span, m; E = modulus of elasticity, MPa
b = beam width, mm, and; d = beam depth, mm

or

In Imperial Units: $\delta = \frac{270wL^4}{E_{apparent}bd^3}$

Where: δ = estimated deflection, inches; w = uniform load, plf
L = span, feet; E = tabulated modulus of elasticity, psi
b = beam width, inches, and; d = beam depth, inches

(e) The tabulated values are based on a reference depth of 305 mm (12 inches). For other depths, when loaded edgewise, the allowable bending stress (F_b) shall be modified by a depth factor, $K_d = (305/d)^{(1/8)}$ for DF LVL (Mill Number 1055 or 1125) or $K_d = (305/d)^{(1/5)}$ for SP LVL (Mill Number 1125), where d is the LVL depth in mm. For depths less than 89 mm (3-1/2 inches), multiply the tabulated value by 1.17 for DF LVL or 1.28 for SP LVL. The depth factor is cumulative with other adjustment factors including duration of load and system factors.

(f) The tabulated values are based on a reference LVL thickness of 44 mm (1-3/4 inches). For other thicknesses, when loaded flatwise, the allowable bending stress (F_b) for both DF and SP LVL shall be modified by a thickness factor, $K_t = (44/t)^{(1/5)}$, where t is the LVL thickness in mm. For thicknesses less than 44 mm (1-3/4 inches), the factor for the 44-mm (1-3/4-inch) thickness shall be used.

(g) Tabulated tensile stresses are for a 1.2-meter (4-foot) LVL length. For greater lengths, the value for both DF and SP LVL shall be adjusted by multiplying the tabulated value by $(1.2/L)^{1/9}$, where L is the LVL length in meters. For lengths less than 1.2 meters (4 feet), use the tabulated value unadjusted.

(h) The tabulated compressive stress perpendicular to grain ($F_{c\perp}$) value for both DF and SP LVL is based on the average stress at the proportional limit or 1 mm (0.04 in.) deformation, whichever is less.

(i) Applicable to DF LVL only.

Table 2. Equivalent Relative Density for Connection Design[a]

Connection Type	True E LVL Grade	Face[b]		Edge[c]	
		DF LVL	SP LVL	DF LVL	SP LVL
Nails and Wood Screws – Withdrawal	1.4E	0.50	NA	0.47	NA
	1.6E	0.50	0.50	0.47	0.43
	2.1E	0.50	0.50	0.50	0.43
	2.3E	0.50	NA	0.50	NA
	2.4E	0.50	NA	0.50	NA
Nails and Wood Screws – Lateral	1.4E	0.50	NA	0.50	NA
	1.6E	0.50	0.55	0.50	0.49
	2.1E	0.50	0.55	0.50	0.49
	2.3E	0.50	NA	0.50	NA
	2.4E	0.50	NA	0.50	NA
Bolts and Lag Screws – Lateral	1.4E	0.47	NA	NA	NA
	1.6E	0.47	0.55	NA	NA
	2.1E	0.50	0.55	NA	NA
	2.3E	0.50	NA	NA	NA
	2.4E	0.50	NA	NA	NA

[a] Similar to those values provided in the applicable code for solid sawn lumber having a minimum specific gravity shown.
[b] Installed perpendicular to the wide face of the LVL.
[c] Installed parallel to the wide face of the LVL.

Table 3. LSD **Factored** Resistances for RigidRim DF LVL Rimboard[a]

True E LVL Grade	Thickness, mm (in.)	Lateral Load[b,c], kN/m (lbf/ft)	Uniform Vertical Load[d] kN/m (lbf/ft)	Lateral Resistance for 13-mm-dia.(1/2-inch-dia.) Lag Screws[e], kN (lbf)
1.4E RigidRim	38 (1-1/2)	3.82 (262)	104 (7,105)	2.97 (667)
	44 (1-3/4)	3.82 (262)	116 (7,975)	2.97 (667)
	89 (3-1/2)	3.82 (262)	207 (14,210)	2.97 (667)

[a] Maximum allowable rim board depth is 406 mm (16 inches).
[b] All design values are applicable to the standard-term load duration and shall be adjusted for other load durations in accordance with the applicable code except that the uniform vertical load is not permitted to be increased for any load durations shorter than the standard-term load duration.
[c] The nailing schedule for sheathing to rim board and for rim board to sill plate (toe-nailed) is based on 2.87 mm x 64 mm (8d box, 0.113 inch x 2-1/2 inches) nails at 152 mm (6 inches) on center. Framing connectors may be used to achieve lateral load capacities exceeding the values shown in this table using the equivalent specific gravity values listed in Table 2.
[d] The factored uniform vertical load is based on the strength of the rim board and may need to be reduced based on the bearing capacity of the supporting wall plate.
[e] Edge distances from the center of the lag screw to the edge of the rim board and deck ledger must be 51 mm (2 inches) or greater. End distances must be 102 mm (4 inches) or greater.

Table 4. Nail Spacing for RigidLam DF and SP LVL[a,b] – Installed Parallel to Gluelines

Product Thickness, mm (in.)	Orientation	Maximum Nail Size/Type			Minimum Spacing[c,d], mm (in.)	Nail End Distance[c], mm (in.)
		Common Nail	Box Nail	Sinker Nail		
RigidLam DF LVL						
32 mm (1-1/4-inch) to less than 38 mm (1-1/2 inch)	Edge	51 mm (6d, 2”)	64 mm (8d, 2-1/2”)	22 mm (6d, 1-7/8”)	76 (3)	38 (1-1/2)
		64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	76 (3)	51 (2)
		83 mm (12d, 3-1/4”)	NA[e]	83 mm (16d, 3-1/4”)	102 (4)	76 (3)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	NA[e]	152 (6)	102 (4)
	Face	64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	51 (2)	(e)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	83 mm (16d, 3-1/4”)	76 (3)	(e)
38 mm (1-1/2 inch) and thicker	Edge	51 mm (6d, 2”)	64 mm (8d, 2-1/2”)	22 mm (6d, 1-7/8”)	51 (2)	25 (1)
		64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	76 (3)	51 (2)
		83 mm (12d, 3-1/4”)	NA[e]	83 mm (16d, 3-1/4”)	102 (4)	76 (3)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	NA[e]	152 (6)	76 (3)
	Face	64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	51 (2)	(e)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	83 mm (16d, 3-1/4”)	76 (3)	(e)
RigidLam SP LVL						
38 mm (1-1/2 inch) to less than 44 mm (1-3/4 inch)	Edge	51 mm (6d, 2”)	64 mm (8d, 2-1/2”)	22 mm (6d, 1-7/8”)	76 (3)	38 (1-1/2)
		64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	102 (4)	51 (2)
		83 mm (12d, 3-1/4”)	NA[e]	83 mm (16d, 3-1/4”)	102 (4)	89 (3-1/2)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	NA[e]	152 (6)	89 (3-1/2)
	Face	64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	76 (3)	38 (1-1/2)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	83 mm (16d, 3-1/4”)	102 (4)	38 (1-1/2)
44 mm (1-3/4 inch) and thicker	Edge	51 mm (6d, 2”)	64 mm (8d, 2-1/2”)	22 mm (6d, 1-7/8”)	51 (2)	38 (1-1/2)
		64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	76 (3)	51 (2)
		83 mm (12d, 3-1/4”)	NA[e]	83 mm (16d, 3-1/4”)	102 (4)	76 (3)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	NA[e]	152 (6)	76 (3)
	Face	64 mm (8d, 2-1/2”)	83 mm (12d, 3-1/4”)	73 mm (10d, 2-7/8”)	51 (2)	38 (1-1/2)
		89 mm (16d, 3-1/2”)	89 mm (16d, 3-1/2”)	83 mm (16d, 3-1/4”)	76 (3)	38 (1-1/2)

[a] Based on the minimum member depth of 89 mm (3-1/2 inches) when nailing into the narrow face of the material, parallel to gluelines.
[b] Edge distance shall be sufficient to prevent splitting, but not less than permitted in CSA O86.
[c] Spacing and end distance apply to a single row of nails.
[d] The minimum allowable edge distance is 6.35 mm (1/4 inch).
[e] NA = Not applicable.

APA – The Engineered Wood Association is an approved national standards developer accredited by American National Standards Institute (ANSI). APA publishes ANSI standards and Voluntary Product Standards for wood structural panels and engineered wood products. APA is an accredited certification body under ISO/IEC 17065 by Standards Council of Canada (SCC), an accredited inspection agency under ISO/IEC 17020 by ANSI National Accreditation Board (ANAB), and an accredited testing organization under ISO/IEC 17025 by ANAB. APA is also an approved Product Certification Agency, Testing Laboratory, Quality Assurance Entity, Validation Entity, and Product Evaluation Entity by the State of Florida, and an approved testing laboratory by City of Los Angeles.

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