

CCMC 13310-R

CCMC Canadian code compliance evaluation

CCMC number:	13310-R
Status:	Active
Issue date:	2008-04-07
Modified date:	2024-03-25
Evaluation holder:	<p>Roseburg Forest Products Co.</p> <p>3660 Gateway Street Springfield OR 97477 United States Website: www.roseburg.com Telephone: 541-679-3311</p>
Product name:	RigidLam® LVL
Compliance:	NBC 2015
Criteria:	CCMC-TG-061710A-15A, "CCMC Technical Guide for Structural Composite Lumber"

In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.

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Compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as a structural composite lumber (SCL) in accordance with the conditions and limitations stated in this evaluation, complies with the following code:

National Building Code of Canada 2015

Code provision	Solution type
4.3.1.1.(1) Buildings and their structural members m ...	<u>Acceptable</u>
9.23.4.2.(3) Spans for Joists, Rafters and Beams	<u>Alternative</u>

The above opinion(s) is/are based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

Product information

Product name

RigidLam® LVL

Product description

The product is a laminated veneer lumber (LVL) that is manufactured by laminating 2.54-mm- or 3.175-mm-thick veneers of a single wood species or species combination that meets the requirements specified in the manufacturer's quality control manual and manufacturing standard. The veneers are laminated with the grain parallel to the length of the member using a phenol-formaldehyde adhesive.

The product is produced in thicknesses ranging from 31.75 mm to 44.45 mm and depths ranging from 89 mm to 1 219 mm. The 31.75-mm to 44.45-mm billets may be glued together to form up to 178-mm-thick beams.

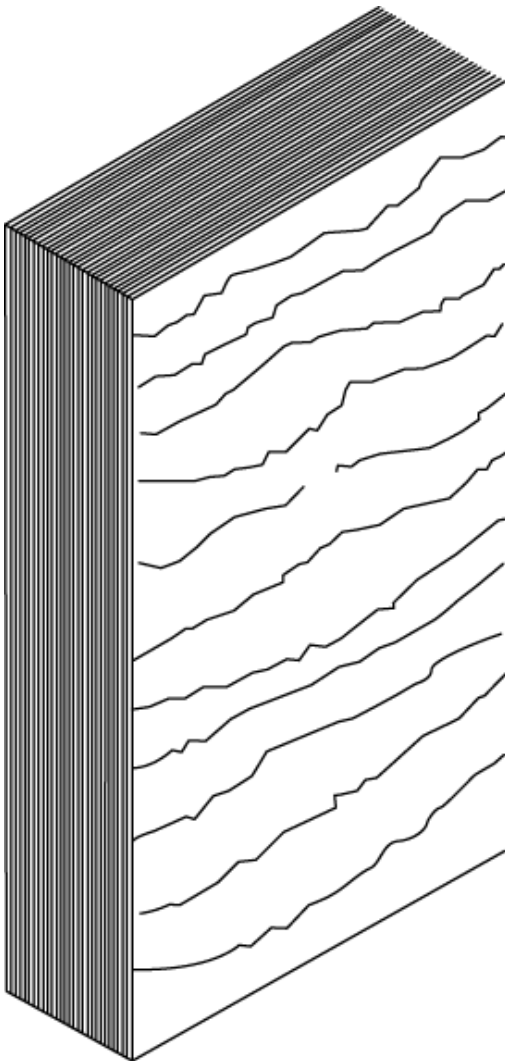


Figure 1. RigidLam® LVL

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Manufacturing plant

This evaluation is valid only for products produced at the following plant:

Product name	Manufacturing plant
	Riddle, OR, US
RigidLam® LVL	☑

☑ Indicates that the product from this manufacturing facility has been evaluated by the CCMC

Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

- The product, as with all SCL, is intended for dry service applications only. ⁽¹⁾
- The product is intended for use in construction as an alternative material to lumber. Proprietary design values for the product are to be used by professional engineers to design in accordance with CSA O86-14, "Engineering Design in Wood," and Part 4, Structural Design, of Division B of the NBC 2015, for use in structural applications such as beams, headers, joists, rafters and columns as intended by the product manufacturer. The specific application must be qualified through testing and validated by the manufacturer. Applications such as I-joist flanges, studs and metal-plated truss chords are beyond the scope of this evaluation.
- The pre-engineered tables in the design guide listed below have been provided to the CCMC by Roseburg Forest Products to demonstrate compliance with Part 9 buildings for acceptance by the local authority having jurisdiction (AHJ):

i. **Roseburg forest products design guide** ⁽²⁾

When the product is used as a joist in simple and multiple spans supporting uniform loads only, the installation must be in accordance with the content of the Roseburg Forest Products' publication entitled "Design Guide – Engineered Wood Products, Limit States Design," dated November 2018.

The product must be installed in accordance with Roseburg Forest Products' installation guidelines noted in the document for those applications falling within the scope of the document. Applications outside the scope of the installation guidelines require engineering on a case-by-case basis.

ii. **Roseburg's installation details**

The product must be installed using nails and bolts in accordance with the manufacturer's size and spacing specifications. The ends of all the beams must be restrained to prevent rollover. The compression edges of all the beams must be continuously laterally supported.

iii. **Engineering required**

For applications beyond the scope/limitations of the above-referenced Roseburg Forest Products' publication or when required by the AHJ, the drawings or related documents must bear the seal of a professional engineer.

The product must be designed in accordance with the requirements of CSA O86 and Part 4 of Division B of the NBC 2015. The specified strengths and fastener limits for the product must not exceed the values set out in [Table 1](#) and [Table 2](#).

iv. **Engineering support provided by manufacturer**

Roseburg Forest Products provides engineering support for their product and may be consulted at:

www.roseburg.com

Tel.: 800-347-7260

Fax: 541-679-2612

Notes:

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- 1 All lumber, wood-based panels and proprietary engineered wood products are intended for dry service conditions. "Dry service" is defined as the in-service environment in which the average equilibrium moisture content (MC) of lumber is 15% or less over a year and does not exceed 19% at any time. Wood contained within the interior of dry, heated or unheated buildings has generally been found to have a MC between 6% and 14% according to season and location. During construction, all wood-based products should be protected from the weather to ensure that the 19% MC is not exceeded in accordance with Article 9.3.2.5., Moisture Content, of Division B of the NBC 2015.

 - 2 The pre-engineered tables present the pre-engineered factored resistance of the beam. The AHJ may require further engineering to determine the factored load in accordance with Part 4, Structural Design, of Division B of the NBC 2015.
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Technical information

This evaluation is based on demonstrated conformance with the following criteria:

Criteria number	Criteria name
CCMC-TG-061710A-15A	CCMC Technical Guide for Structural Composite Lumber

Design requirements

Table 1. Specified strengths (MPa) and modulus of elasticity (MPa) ⁽¹⁾ of the product

Property	Grade 1.5E	Grade 1.8E	Grade 2.0E	Grade 2.2E	
Bending (edge loading) ⁽²⁾ , f_b	28.67	33.13	39.50	39.50	
Bending (plank loading) ⁽³⁾ , f_b	28.02	33.13	34.56	39.50	
Tensile (parallel to grain) ⁽⁴⁾ , f_t	15.98	18.11	22.38	22.38	
Compressive (parallel to grain), f_c	21.46	26.41	33.01	33.01	
Compressive (perpendicular to grain), f_{cp}	parallel to glue line (beam)	7.22	8.79	9.41	9.41
	perpendicular to glue line (plank)	8.11	8.11	8.11	8.11
Horizontal shear, f_v	perpendicular to glue line (beam)	2.82	3.59	3.72	3.72
	parallel to glue line (plank)	1.37	1.54	1.54	1.52
Apparent modulus of elasticity ⁽⁵⁾ , E_{Apparent}	edge bending	10 340	12 410	13 790	15 170
	plank bending	10 340	12 410	13 790	15 170
True (shear-free) modulus of elasticity, E_{True}	edge bending	11 030	13 100	14 480	15 860
	plank bending	11 030	13 100	14 480	15 860

Notes:

- 1 The values are in accordance with CSA O86.
- 2 The specified edgewise bending strength, f_b , is based on a standard depth of 305 mm. For other depths, multiply by $K_{zb} = (305/d)^{1/8}$, where d = depth (mm). For depths less than 89 mm, multiply by $K_{zb} = 1.166$.
- 3 The specified plankwise bending strength, f_b , is based on a standard thickness of 44.5 mm. For thicknesses exceeding 44.5 mm, multiply by $K_{zb} = (44.5/t)^{1/5}$, where t = thickness (mm). For thicknesses less than 44.5 mm, multiply by $K_{zb} = 1.0$.
- 4 The specified tensile strength, f_t , is based on a standard length of 6 096 mm. For other lengths, multiply by $K_{zt} = (6\ 096/L)^{1/9}$, where L = length (mm). For lengths less than 1 220 mm, multiply by $K_{zt} = 1.196$.

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5 For uniformly loaded simple span beams, the deflection must be calculated as follows:

$$\delta = 5wL^4/384 EI$$

where:

δ = deflection (mm)

w = specific uniform load (N/mm)

L = span (mm)

E = apparent modulus of elasticity

I = moment of inertia = $bd^3/12$ (mm⁴)

Table 2. Relative density (or specific gravity) for fastener design for the product

Veneer species	LVL grade	Nails				Bolts ⁽¹⁾
		Lateral loads		Withdrawal loads		Lateral loads
		Face ⁽²⁾	Edge ⁽²⁾	Face	Edge	Face ⁽²⁾
Douglas Fir	1.5E	0.50	0.50	0.50	0.47	0.47
	1.8E	0.50	0.50	0.50	0.50	0.50
	2.0E	0.50	0.50	0.50	0.50	0.50
	2.2E	0.50	0.50	0.50	0.50	0.50

Notes:

¹ For 12.7-mm or 19.1-mm bolts.

² Load direction perpendicular to and parallel to the grain.

Table 3. Nail spacing ⁽¹⁾ – installed parallel to the glue line

Product thickness	Nail type and size	Minimum nail spacing ⁽²⁾ ⁽³⁾ (mm)	Nail end distance ⁽²⁾ (mm)
Less than 38 mm	8d box	76.2	38.1
	8d common	76.2	50.8
	10d and 12d box	76.2	50.8
	10d and 12d common	101.6	76.2
	16d sinker	101.6	76.2
	16d common	152.4	101.6

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Product thickness	Nail type and size	Minimum nail spacing ⁽²⁾ ⁽³⁾ (mm)	Nail end distance ⁽²⁾ (mm)
38 mm and greater	8d box	50.8	25.4
	8d common	76.2	50.8
	10d and 12d box	76.2	50.8
	10d and 12d common	101.6	76.2
	16d sinker	101.6	76.2
	16d common	152.4	76.2

Notes:

- 1 The above table is based on a minimum member depth of 88.9 mm when nailing into the narrow face of the material, parallel to the glue line.
- 2 Spacing and end distances apply to single rows of nails.
- 3 The minimum allowable edge distance is 6.35 mm.

This evaluation is applicable only to this product when labelled with the APA EWS certification mark and the phrase "CCMC 13310-R" on each member.

The manufacturing quality assurance program has been adapted to include requirements specified in ASTM D5456-14b, "Standard Specification for Evaluation of Structural Composite Lumber Products," and is verified by APA – The Engineered Wood Association as part of the product certification. APA – The Engineered Wood Association conducts monthly audits of the manufacturing plants and the quality assurance program.

Additional information

The design values specified in this evaluation were obtained from testing in conformance with ASTM D5456-14 and are summarized below. The manufacturer’s published pre-engineered beam and header spans were designed in accordance with CSA O86-14.

Table 4. Additional test information for the product

Property	Test information
Bending	Specimens were tested in edge and plank bending to establish the characteristic value and volume adjustment exponent. Qualification test data was used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from CSA O86 was used to determine the specified strength.
Shear	Specimens were tested in shear to establish the characteristic value. Qualification test data was used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from CSA O86 was used to determine the specified strength.

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Property	Test information
Compression parallel to grain	Specimens were tested to establish the characteristic value. Qualification test data was used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from CSA O86 was used to determine the specified strength.
Compression perpendicular to grain	Specimens were tested in edge and plank compression to establish the characteristic value. The characteristic value was multiplied by 1.09 to establish the specified strength in accordance with CSA O86.
Tension parallel to grain	Specimens were tested to establish the characteristic value and volume adjustment exponent. Qualification test data was used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from CSA O86 was used to determine the specified strength.
Nail withdrawal	Nail withdrawal values were established following ASTM D1761-06, "Standard Test Methods for Mechanical Fasteners in Wood," for an 8d common nail having a 38-mm penetration. Specimens were tested and an equivalent species capacity was determined in accordance with ASTM D5456-01, A2.
Nail bearing	Nail bearing strength was determined in accordance with ASTM D5764-97a(2007), "Standard Test Method for Evaluating Dowel-Bearing Strength of Wood and Wood-Based Products," with 10d common nails with a nominal diameter of 3.76 mm. Specimens were tested and the mean bearing capacity was used to establish the equivalent species capacity in accordance with ASTM D5456-01, A2.
Bolt bearing	Bolt bearing capacity was determined in accordance with ASTM D5764 with 13-mm and 19-mm bolts. Specimens were tested and the mean bolt bearing capacity was used to establish the equivalent species capacity in accordance with ASTM D5456-01, A2.
Creep and recovery	The SCL specimens were subjected to a 90-day creep test for duration of load for verification of equivalency to lumber in accordance with the principles of ASTM D6815-09, "Standard Specification for Evaluation of Duration of Load and Creep Effects of Wood and Wood-Based Products." The criteria were met and the specimens deemed equivalent to lumber.
Adhesive	The phenol-formaldehyde adhesive complies with CSA O112.6-M1977, "Phenol and Phenol-Resorcinol Resin Adhesives for Wood (High Temperature Curing)."

Administrative information

Use of Canadian Construction Materials Centre (CCMC) assessments

This assessment must be read in the context of the entire [CCMC Registry of Product Assessments](#), any applicable building code or by-law requirements, and/or any other regulatory requirements (for example, the [Canada Consumer Product Safety Act](#), the [Canadian Environmental Protection Act](#), etc.).

It is the responsibility of the user to confirm that the assessment they are using is current and has not been withdrawn or superseded by a later version on the [CCMC Registry of Product Assessments](#).

Disclaimer

The National Research Council of Canada (NRC) has evaluated only the characteristics of the specific product described herein. The information and opinions in this evaluation are directed to those who have the appropriate degree of experience to use and apply its contents (such as authorities having jurisdiction, design professionals and specifiers). This evaluation is valid when the product is used as part of permitted construction, respecting all conditions and limitations stated in the evaluation, and in accordance with applicable building codes and by-laws.

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Language

Une version française de ce document est disponible.

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CCMC recognition

The Canadian Construction Materials Centre (CCMC) assesses compliance with Canadian building, energy and safety codes. We are the only construction code compliance service supported and operated by the Government of Canada. Trusted by over 6,000 regulators across Canada.

Most Canadian authorities having jurisdiction (AHJs) consider CCMC product assessments acceptable as evidence for product approval.

CCMC assessments are recognized by construction authorities across Canada:

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(Alliance of Canadian Building Official Associations (ACBOA))

First Nations National Building Officers Association (FNNBOA)



(First Nations National Building Officers Association (FNNBOA))

Canadian Home Builders' Association (CHBA)



(Canadian Home Builders' Association (CHBA))

Alberta Building Officials Association (ABOA)



(Alberta Building Officials Associations (ABOA))

Saskatchewan Building Officials Association (SBOA)



(Saskatchewan Building Officials Association (SBOA))

Manitoba Building Officials Association (MBOA)



(Manitoba Building Officials Association (MBOA))

Ontario Building Officials Association (OBOA)



(Ontario Building Officials Association (OBOA))

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(Nova Scotia Building Officials Association (NSBOA))

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For more information, contact the CCMC by phone at (613) 993-6189 or by email at ccmc@nrc-cnrc.gc.ca

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Code compliance as an acceptable solution

Code Compliance via Acceptable Solutions

If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

Code compliance as an alternative solution

Code Compliance via Alternative Solutions

Where a design differs from the acceptable solutions in Division B, then it should be treated as an **"alternative solution."** A proponent of an alternative solution must demonstrate that the alternative solution addresses the same issues as the applicable acceptable solutions in Division B and their attributed objectives and functional statements. However, because the objectives and functional statements are entirely qualitative, demonstrating compliance with them in isolation is not possible. Therefore, Clause 1.2.1.1.(1)(b) identifies the principle that Division B establishes the quantitative performance targets that alternative solutions must meet. In many cases, these targets are not defined very precisely by the acceptable solutions [...] Nevertheless, Clause 1.2.1.1.(1)(b) makes it clear that an effort must be made to demonstrate that an alternative solution will perform as well as a design that would satisfy the applicable acceptable solutions in Division B—not “well enough” but “as well as.”

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(b)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Alternative Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

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