PRODUCT REPORT®
CANADA
www.apawood.org

Nordic Lam™
Nordic Structures

PR-L294C
Revised December 21, 2020

Products: Nordic Lam™
Nordic Structures, 1100 Avenue des Canadiens-de-Montréal, Suite 100, Montreal, Québec H3B 2S2, Canada
(514) 871-8526
www.nordic.ca

1. Basis of the product report:
   - 2015 National Building Code of Canada (NBC): Clause 1.2.1.1 of Division A and Clauses 4.1, 4.3.1, 9.23.4.2, and 9.23.10.1 of Division B
   - CSA O86-19 Engineering Design in Wood
   - CSA O122-16 Structural Glued Laminated Timber
   - CSA O177-06 (R2015) Qualification Code for Manufacturers of Structural Glued-Laminated Timber
   - APA Reports T2001P-85, T2003P-21, T2004P-43, T2005P-74, T2006P-45, T2008P-91, T2009P-39, and T2012P-41, FPInnovations Reports 201003404, 201003409, 201005209, 301008842, 301009694, and 301011496, and other qualification data

2. Product description:
   Nordic Lam™ is structural glued laminated timber (glulam) manufactured with Spruce-Pine-Fir (mainly Black Spruce) lumber in accordance with layup combinations developed in accordance with the principle of ASTM D3737. Nordic Lam is used as beams, headers, rafters, purlins, columns, studs, and decking, and is manufactured in nominal widths ranging from 38 to 686 mm (1-1/2 to 27 inches), a variety of depths, and lengths up to 24.4 meters (80 feet), in accordance with Table 1.

3. Design properties:
   Table 2 lists the engineering properties for Nordic Lam beams. The maximum design loads for Nordic Lam beams shall be in accordance with the recommendations provided by the manufacturer (www.nordic.ca/en/documentation/technical-documents/ns-gt5-ca).

   Table 3 lists the engineering properties for Nordic Lam columns. The maximum design loads for Nordic Lam columns shall be in accordance with the recommendations provided by the manufacturer (www.nordic.ca/en/documentation/technical-documents/ns-gt5-ca).

4. Product installation:
   Nordic Lam beams and columns shall be installed in accordance with the recommendations provided by the manufacturer (www.nordic.ca/en/documentation/technical-documents/ns-gt5-ca) and APA Technical Note: *Glulam Connection Details*, Form T300 (www.apawood.org/resource-library). Permissible field notching and drilling of Nordic Lam beams shall be in accordance with the recommendations provided by the manufacturer and APA Technical Notes: *Field Notching and Drilling of Glued Laminated Timber Beams*, Form S560, and *Effect of Large Diameter Horizontal Holes on the Bending and Shear Properties of Structural Glued Laminated Timber*, Form V700 (see link above). Permissible field notching and drilling of Nordic Lam columns shall be in accordance with the recommendations provided by the manufacturer.

5. Fire-rated assemblies:
   Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer (see link above). Procedures specified in Annex B of the 2019

CSA O86 may be considered in designing glulams exposed to fire up to 2 hours when permitted by the authority having jurisdiction. The fire-resistance rating shall be evaluated in accordance with Appendix D-2.11 of the 2015 NBC.

Nordic Lam has been tested in accordance with CAN/ULC S102 and meets the flame-spread rating of 26 – 75 and smoke developed classification of 0 – 450.

6. Limitations:
   a) Nordic Lam beams and columns shall be designed in accordance with the code using the engineering properties specified in this report.
   b) The dimensions of Nordic Lam beams and columns shall follow those specified in Table 1.
   c) Nordic Lam beams and columns shall be manufactured in accordance with layup combinations specified in ANSI 117, *Standard Specification for Structural Glued Laminated Timber of Softwood Species*, or proprietary Nordic Lam manufacturing specifications documented in the in-plant manufacturing standard approved by APA.
   d) Nordic Lam is produced at the Nordic Structures, Chibougamau, Quebec facilities under a quality assurance program audited by APA.
   e) This report is subject to re-examination in one year.

7. Identification:
   Nordic Lam described in this report is identified by a label bearing the manufacturer's name (Nordic Structures) and/or trademark, the APA assigned plant number (1057), the APA logo, the combination symbol, the report number PR-L294, and a means of identifying the date of manufacture.

Table 1. Dimensions for Nordic Lam layups.

Layup	Minimum width, b (mm)	Maximum width, b (mm)	Minimum depth	Maximum depth, h (mm)
20F-E8M1	38	191	4 lams	457
20F-ES/CPG	79[(1)]	89	4 lams	457
24F-E/ES1M1	38	191	4 lams	914[(2)]
24F-ES/MSR	79	89	4 lams	914[(2)]
24F-ES/NPG	38	686	4 lams	NA[(2)]
ES11	38	191	2 lams	381
ES11/NPG	38	191	2 lams	381
ES12	38	191	2 lams	381
ES12/NPG	38	686	2 lams	1,372[(2)]

[(1)] The minimum width shall be permitted to be 38 mm when 24F-ES/NPG is trademarked as 20F-ES/CPG.
[(2)] The maximum depth shall not exceed the tabulated depth or a depth-to-width ratio of 12:1, whichever is smaller.

Table 2. Specified Strengths (MPa) and Relative Density for Nordic Lam Beams[1,2,3]

Stress grade	20F-1.9E	20F-1.6E	24F-1.9E	24F-1.9E	24F-1.9E	Wet-Use Factor
EWS combination layup symbol[9]	20F-ES/CPG	20F-E8M1	24F-E/ES1M1	24F-ES/NPG	24F-ES/MSR	
Bending about X-X Axis (Loaded Perpendicular to Wide Faces of Laminations)						
Bending at extreme fibre due to positive bending moment (F_{bx}^{+})[7]	25.6	25.6	30.7	30.7	30.7	0.80
Bending at extreme fibre due to negative bending moment (F_{bx}^{-})[7]	25.6	25.6	30.7	30.7	30.7	0.80
Longitudinal shear (F_{vx})[4,8]	2.2	2.2	2.2	2.5	2.2	0.87
Compression perpendicular to grain (F_{cpx})[10]						
Compression face	5.8	5.8	7.5[6]	7.5[6]	7.5[6]	0.67
Tension face	5.8	5.8	7.5[6]	7.5[6]	7.5[6]	0.67
True Modulus of Elasticity (E_x)	13,100	11,000	13,100	13,100	13,100	0.90
Apparent Modulus of Elasticity ($E_{x,app.}$)[5]	12,400	10,300	12,400	12,400	12,400	0.90
Bending about Y-Y Axis(Loaded Parallel to Wide Faces of Laminations)						
Bending at extreme fibre due to Positive Bending Moment (F_{by}^{+})[7]	25.6	13.4	14.1	30.7	14.1	0.80
Bending at extreme fibre due to Negative Bending Moment (F_{by}^{-})[7]	25.6	13.4	14.1	30.7	14.1	0.80
Longitudinal shear (F_{vy})[4]	2.2	1.5	1.5	2.5	1.5	0.87
Compression perpendicular to grain (F_{cpy})						
Compression face	5.8	3.9	3.8	7.5[6]	3.8	0.67
Tension face	5.8	3.9	3.8	7.5[6]	3.8	0.67
True Modulus of Elasticity (E_y)	13,100	10,300	11,000	13,100	11,000	0.90
Apparent Modulus of Elasticity ($E_{y,app.}$)[5]	12,400	9,700	10,300	12,400	10,300	0.90
Axially Loaded						
Compression parallel to grain (F_c)	14.4	14.4	16.5	33.0	16.5	0.75
Tension parallel to grain (F_t)	10.2	10.2	13.4	20.4	13.4	0.75
Tension perpendicular to grain (F_{tp})	0.51	0.51	0.51	0.51	0.51	0.85
Modulus of elasticity (E_{axial})	13,100	9,700	11,000	13,100	11,000	0.90
Connections Design						
Mean oven-dry relative density (G)	0.42	0.42	0.42	0.47	0.42	–

(1) The combinations in this table are applicable to members consisting of 4 or more laminations, unless otherwise noted.
(2) Design of glulam members shall be in accordance with CSA O86, Engineering Design in Wood (Limit States Design).
(3) The tabulated design values are for standard-term load duration and dry conditions of use. For other load durations, see applicable design code. For wet conditions of use, multiply the tabulated values by the wet-use factors shown in the rightmost column of the table.
(4) Specified longitudinal shear has been adjusted to a 2.0 m^3 of beam volume.
(5) The tabulated apparent E values have already included a 5% shear deflection.
(6) The F_{cp} value is applicable to glulam members made with manufactured lumber. Otherwise, the F_{cp} value shall be 7.0 MPa.
(7) In calculating the size factor for bending, K_{zbg}, the beam width, b, must be taken as the full member width (mm).
(8) In calculating the factored fracture shear resistance at a notch on the tension side at a support, F_r, the effective lamination width, b_{eff}, must be taken as the beam width (mm).
(9) ES = Eastern spruce.
(10) In calculating the size factor for bearing, K_{zcp}, the beam width, b, must be taken as the full member width (mm).

Table 3. Specified Strengths (MPa) and Relative Density for Nordic Lam Columns[1,2,3]

Stress grade	ES11	ES11	ES12	ES12	Wet-Use Factor
EWS combination layup symbol[8]	EWS ES11	ES11/NPG	EWS ES12	ES12/NPG	
Bending about X-X Axis (Loaded Perpendicular to Wide Faces of Laminations)					
Bending at extreme fibre due to positive bending moment (F_{bx}^{+})[9]	17.2[6]	17.2	24.9[6]	30.7	0.80
Bending at extreme fibre due to negative bending moment (F_{bx}^{-})[9]	17.2[6]	17.2	24.9[6]	30.7	0.80
Longitudinal shear (F_{vx})[4,10]	2.2	2.2	2.2	2.5	0.87
Compression perpendicular to grain (F_{cpx})[11]					
Compression face	5.8	5.8	7.5[7]	7.5[7]	0.67
Tension face	5.8	5.8	7.5[7]	7.5[7]	0.67
True Modulus of Elasticity (E_x)	11,000	11,000	13,100	13,100	0.90
Apparent Modulus of Elasticity ($E_{x,app.}$)[5]	10,300	10,300	12,400	12,400	0.90
Bending about Y-Y Axis (Loaded Parallel to Wide Faces of Laminations)					
Bending at extreme fibre due to Positive Bending Moment (F_{by}^{+})	22.4 (4+ lams) 20.4 (3 lams) 17.9 (2 lams)	22.4 (4+ lams) 20.4 (3 lams) 17.9 (2 lams)	30.7 (4+ lams) 30.7 (3 lams) 29.4 (2 lams)	30.7 (4+ lams) 30.7 (3 lams) 29.4 (2 lams)	0.80
Bending at extreme fibre due to Negative Bending Moment (F_{by}^{-})	22.4 (4+ lams) 20.4 (3 lams) 17.9 (2 lams)	22.4 (4+ lams) 20.4 (3 lams) 17.9 (2 lams)	30.7 (4+ lams) 30.7 (3 lams) 29.4 (2 lams)	30.7 (4+ lams) 30.7 (3 lams) 29.4 (2 lams)	0.80
Longitudinal shear (F_{vy})[4]	1.5	1.5	1.5	2.5	0.87
Compression perpendicular to grain (F_{cpy})					
Compression face	5.8	5.8	7.5[7]	7.5[7]	0.67
Tension face	5.8	5.8	7.5[7]	7.5[7]	0.67
True Modulus of Elasticity (E_y)	11,000	11,000	13,100	13,100	0.90
Apparent Modulus of Elasticity ($E_{y,app.}$)[5]	10,300	10,300	12,400	12,400	0.90
Axially loaded					
Compression parallel to grain (F_c)	22.3 (4+ lams) 19.4 (2-3 lams)	22.3 (4+ lams) 19.4 (2-3 lams)	33.0 (4+ lams) 24.4 (2-3 lams)	33.0 (4+ lams) 24.4 (2-3 lams)	0.75
Tension parallel to grain (F_t)	12.5	12.5	20.4	20.4	0.75
Tension perpendicular to grain (F_{tp})	0.51	0.51	0.51	0.51	0.85
Modulus of elasticity (E_{axial})	11,000	11,000	13,100	13,100	0.90
Connections Design					
Mean oven-dry relative density (G)	0.42	0.42	0.42	0.47	–

(1) The combinations in this table are applicable to members consisting of 4 or more laminations, unless otherwise noted.
(2) Design of glulam members shall be in accordance with CSA O86, Engineering Design in Wood (Limit States Design).
(3) The tabulated design values are for standard-term load duration and dry conditions of use. For other load durations, see applicable design code. For wet conditions of use, multiply the tabulated values by the wet-use factors shown in the rightmost column of the table.
(4) Specified longitudinal shear has been adjusted to a 2.0 m^3 of beam volume.
(5) The tabulated apparent E values have already included a 5% shear deflection.
(6) When the member depth is greater than 381 mm (15 inches), the tabulated F_{bx} values shall be multiplied by a factor of 0.88.
(7) The F_{cp} value is applicable to glulam members made with manufactured lumber. Otherwise, the F_{cp} value shall be 7.0 MPa.
(8) ES = Eastern Spruce.
(9) In calculating the size factor for bending, K_{Zbg}, the beam width, b, must be taken as the full member width (mm).
(10) In calculating the factored fracture shear resistance at a notch on the tension side at a support, F_r, the effective lamination width, b_{eff}, must be taken as the beam width (mm).
(11) In calculating the size factor for bearing, K_{Zcp}, the beam width, b, must be taken as the full member width (mm).

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 International Code Council (ICC) International Accreditation Service (IAS), and an accredited testing organization under ISO/IEC 17025 by IAS. APA is also an approved Product Certification Agency, Testing Laboratory, Quality Assurance Entity, and Validation Entity by the State of Florida, and an approved testing laboratory by City of Los Angeles.

APA – THE ENGINEERED WOOD ASSOCIATION
HEADQUARTERS
7011 So. 19th St. ▪ Tacoma, Washington 98466
Phone: (253) 565-6600 ▪ Fax: (253) 565-7265 ▪ Internet Address: www.apawood.org

PRODUCT SUPPORT HELP DESK
(253) 620-7400 ▪ *E-mail Address*: help@apawood.org

DISCLAIMER