

## Design Properties, Nordic Glued Laminated Timber

### SPECIFIED STRENGTHS<sup>(1)(2)</sup>

Product	Nordic Lam	Nordic Lam
Application	Beams and columns	Decking
Appearance grade	Architectural	Architectural
Stress grade	24F/ES12	ES11
<b>Bending about X-X axis (loaded perpendicular to wide face of laminations)</b>		
Bending at extreme fibre ( $F_{bx}$ ) <sup>(3)(4)</sup>	30.7 MPa	17.2 MPa
Longitudinal shear ( $F_{vx}$ ) <sup>(4)(5)</sup>	2.2 MPa	2.2 MPa
Compression perpendicular to grain ( $F_{cpX}$ )	7.0 MPa	5.8 MPa
Shear-free modulus of elasticity ( $E_x$ )	13 100 MPa	10 900 MPa
Apparent modulus of elasticity ( $E_{x, app.}$ ) <sup>(9)</sup>	12 400 MPa	10 300 MPa
<b>Bending about Y-Y axis (loaded parallel to wide face of laminations)<sup>(7)</sup></b>		
Bending at extreme fibre ( $F_{by}$ ) <sup>(4)</sup>	30.7 MPa	22.4 MPa
Longitudinal shear ( $F_{vy}$ ) <sup>(4)(5)</sup>	1.9 MPa	1.9 MPa
Compression perpendicular to grain ( $F_{cpY}$ )	7.0 MPa	5.8 MPa
Shear-free modulus of elasticity ( $E_y$ )	13 100 MPa	10 900 MPa
Apparent modulus of elasticity ( $E_{y, app.}$ ) <sup>(9)</sup>	12 400 MPa	10 300 MPa
<b>Axially loaded</b>		
Compression parallel to grain ( $F_c$ ) <sup>(4)</sup>	33.0 MPa	22.3 MPa
Tension parallel to grain ( $F_t$ )	20.4 MPa	12.5 MPa
Modulus of elasticity ( $E_a$ )	12 400 MPa	10 300 MPa

<sup>(1)</sup> The tabulated design values are for dry service conditions.

<sup>(2)</sup> The tabulated design values are for standard term duration of load.

<sup>(3)</sup> Nordic Lam bending members are symmetrical throughout the depth of the member (balanced layups).

<sup>(4)</sup> Specified strengths for glued-laminated timber members in a system consisting of three or more essentially parallel members spaced not more than 610 mm apart and supporting the applied load may be multiplied by a system factor,  $K_H$ , equal to 1.10.

<sup>(5)</sup> Specified strengths in shear adjusted to a 2 m<sup>3</sup> of beam volume. At the location of notches in rectangular members, the specified strength in shear ( $F_v$ ) shall be multiplied by a notch factor,  $K_N$ , determined per CSA O86-09, Clause 6.5.7.2.2.

<sup>(6)</sup> The tabulated "apparent E" values already include a 5% shear deflection.

<sup>(7)</sup> Vertically glued-laminated beams, the narrow faces of whose laminations are normal to the direction of load, shall be designed using the above strength properties for bending about Y-Y axis.

<sup>(8)</sup> Design of glulam members shall be in accordance to CSA O86-09 Standard.

<sup>(9)</sup> The specific gravity for dowel-type fastener design is 0.41. Member weight shall be based on density of 5.5 kN/m<sup>3</sup>.

\* The Nordic Lam products are listed in CCMC evaluation report 13216-R. The above design properties refer to combined stress grades 24F-1.9E (or 24F-E/ES1M1) and ES12 for bending and compression members, respectively, of four or more laminations. The decking is made of ES11 stress grade, four or more laminations.

### APPEARANCE GRADE

**Architectural:** Members may contain natural growth characteristics allowed in specific grades of laminating stock. Sides shall be surfaced true to specified dimensions, free from squeeze-out glue, and sanded smooth. Tight knots and stains are permitted to appear on the finished surface. Loose knots, knot holes, wane, and pitch pockets shall be replaced with sound stock or non-shrinking waterproof filling material. No wood shall be removed from tension laminations for the purpose of inserting replacement stock. Planing misses along laminations shall be patched with replacement stock. Wood inserts and filling are not required.