

Nordic X-Lam Panels - Axial Loads

CHECKLIST: Nordic X-Lam Panels

To verify that the tabulated resistances are appropriate for the structure being designed, the following questions should be asked (the appropriate modification factor is given in brackets):

1. Is load duration "standard" (K_D)?

K_D is a load duration factor. The tabulated resistances are based on a standard term load ($K_D = 1.0$), which includes the effects of dead loads plus live loads due to use and occupancy, and snow loads.

2. Is the service condition "dry" (K_S)?

K_S is a service condition factor. The tables are limited to dry service conditions ($K_S = 1.0$).

3. Is the material free of incising and/or strength-reducing chemicals (K_T)?

K_T is a treatment factor. The tables are based on untreated timber ($K_T = 1.0$).

4. Is the effective length factor, K_e , equal to 1.0 and the effective panel length in the direction of buckling equal to the total panel length?

5. Are the panels concentrically loaded or subjected to a maximum eccentricity of 1/6 the panel thickness?

If the answer to any of these questions is no, the Panel Selection Tables may not be used. Instead, calculate P_r from the formula given in CSA O86-09, Clause 5.5.6. Information on eccentrically loaded walls is provided in the CLT manual. Note that in certain cases the National Building Code of Canada permits a reduction in the loads due to use and occupancy depending upon the size of the tributary area (refer to Article 4.1.5.8 of the 2010 NBCC).

Note: Since panel design is an iterative process, the tables may be used to select a trial section. When designing a panel with an effective length factor K_e other than 1.0, a preliminary section may be selected by using the table for $K_e = 1.0$ with L equal to the actual effective length $K_e L$. The preliminary section can then be checked using the design standard (note the difference between the estimated resistance and the actual resistance will not usually exceed 5%).

Earthquake safety of buildings -

Buildings are constructed with panels of a maximum width of 2440 mm. The panels are joined to one another by mechanical fasteners. The connection between the boards, which make up the walls and ceilings, is done through metal plates, nails with improved adhesion and self-drilling screws. Usage of plates with limited sizes makes handling and installation easy and, owing to the integration of a great number of mechanical connections, enhances ductility as well as the building's capacity to dissipate energy generated by the earthquake.

Panel Selection Tables

Nordic X-Lam E1

 P_R

 Ultimate limit states
 Maximum uniform load P_R (kN/m)

L (m)	Major strength direction Layup Combinaison				Minor strength direction Layup Combinaison	
	78-3s	105-3s	131-5s	175-5s	131-5s	175-5s
2,0	382	644	768	1121	149	223
2,5	295	548	688	1057	125	201
3,0	224	454	601	981	102	177
3,5	170	371	515	896	81	153
4,0	130	302	437	807	65	131
4,5		246	369	720		111
5,0		200	311	638		94
5,5			262	562		
6,0			221	495		
6,5			187	435		
7,0				382		
7,5				336		
8,0				296		
8,5				261		
9,0						

 P_R

 Ultimate limit states
 Maximum uniform load P_R (kN/m)

L (m)	Major strength direction Layup Combinaison				Minor strength direction Layup Combinaison	
	78-3s	105-3s	131-5s	175-5s	131-5s	175-5s
2,0	510	861	1044	1515	262	416
2,5	380	728	935	1438	202	361
3,0	275	592	809	1336	150	301
3,5	199	469	681	1216	111	244
4,0	145	368	563	1087	82	195
4,5		288	460	956		155
5,0		226	375	831		124
5,5			305	716		
6,0			250	615		
6,5			0	526		
7,0				451		
7,5				387		
8,0				333		
8,5				288		
9,0						

Notes:

1. The tabulated axial resistances are based on simply axially loaded walls subjected to a maximum eccentricity of 1/6 wall thickness, or on simply axially loaded walls subjected to concentric end loads only. For side loads, other eccentric end loads, or other combined axial and flexural loads, see the CLT manual.
2. For $L \leq 2,0$ m, use P_R for $L = 2,0$ m. Where P_R values are not given, the slenderness ratio exceeds 150 (maximum permitted).
3. A complete design shall include the verifications of bearing resistance and fire safety requirements.
4. L = unsupported length