

Dimensional Changes

Introduction¹

Dimensional changes in the length, depth and width of structural glued laminated timber due to changes in moisture content are minimized in comparison to sawn timbers and lumber. This is primarily due to the glulam manufacturing process - the result is finished glulam products with average moisture contents in the $12 \pm 2\%$ range at the time of manufacture. Dimensional changes in glulam due to moisture content increases are typically temporary and may occur if members undergo moisture content changes when exposed to the element during transit, interim storage periods or jobsite storage over prolonged periods. Reasonable estimates can be made for dimensional changes of glulam using calculations based on estimates of net moisture content changes.

Dimensional Tolerances at the Time of Manufacture

Nordic Lam products are manufactured in accordance with provisions of ANSI A190.1, *American National Standard for Wood Products - Structural Glued Laminated Timber* and CSA O122 Standard, *Structural glued-laminated timber*. The following permissible dimensional tolerances are applicable at the time of manufacture:

Width + 0 mm | - 2.0 mm

Depth + 1.0 mm | - 2.0 mm per 300 mm of depth, to a maximum of + 3.0 mm | - 6.0 mm

Length + 2 mm | - 4 mm

Shrinkage and Swelling Characteristics of Wood

Dimensional changes are largest in the tangential and radial directions, but the net change in a glulam member results from a composite behavior, or net effect of changes in the respective laminations making up the member. Tables 1 and 2 tabulate examples of average tangential and radial changes for Nordic Lam beams. It is important to note that the dimensional changes in a glulam member due to moisture variations that may occur during the shipping, storage and installation cycle may exceed the dimensional tolerances that are permitted at the time of manufacture.

TABLE 1

TOTAL WIDTH CHANGES FOR INDICATED M.C. RANGES

$C_{T,R}$	M.C.i	M.C.f	M.C.i	M.C.f
0,002	12%	8%	12%	15%
Initial Width	Total Change	Final Width	Total Change	Final Width
b_i (mm)	Δ_b (mm)	b_f (mm)	Δ_b (mm)	b_f (mm)
137	-1,10	135,9	0,82	137,8
184	-1,47	182,5	1,10	185,1
228	-1,82	226,2	1,37	229,4

TABLE 2

TOTAL DEPTH CHANGES FOR INDICATED M.C. RANGES

$C_{T,R}$	M.C.i	M.C.f	M.C.i	M.C.f
0,002	12%	8%	12%	15%
Initial Depth	Total Change	Final Depth	Total Change	Final Depth
d_i (mm)	Δ_d (mm)	d_f (mm)	Δ_d (mm)	d_f (mm)
362	-2,90	359,1	2,17	364,2
597	-4,78	592,2	3,58	600,6
826	-6,6	819,4	4,96	831,0

Additional Note

- The dimensional changes to cross-laminated timber panels can be estimated similarly for the panel height (i.e. 0,2% per percentage change in moisture content); dimensional changes in the width direction and the length of the panels are negligible (0,007% per percentage change in moisture content).

¹ Ref.: Dimensional Changes in Structural Glued Laminated Timber (Form No. EWS Y260), APA - Engineered Wood Systems