



November 21, 2011

To Whom It May Concern:

The intent of this letter is to address the minimum nail spacing requirements for structural glued laminated timbers (glulams).

Glulams are normally manufactured with lumber laminations using layup combinations that are engineered for the efficient use of natural resources. The most common glulam beams in the U.S. western states are manufactured in accordance with the 24F-V4 layup combination using high quality dense 2x Douglas fir-Larch lumber with a published specific gravity of 0.50. In the U.S. southern states, the most common glulam beams are manufactured in accordance with the 24F-V3 layup combination using high quality dense 2x Southern pine lumber with a published specific gravity of 0.55. The glulam specific gravity for a specific layup combination is published in the NDS Supplement Tables 5A and 5B, APA Glulam Design Specification, and ICC ES ESR-1940, and can be used for fastener design.

Since glulams are manufactured with solid 2x laminating lumber, the minimum nail spacing for glulams has traditionally followed the same requirements as lumber. In Section 11.1.5.6 of the 2005 NDS, the following requirements are specified:

11.1.5.6 Edge distances, end distances, and spacings shall be sufficient to prevent splitting of the wood.

This empirical-based provision has been in existence for a very long time. While this provision does not quantify the exact minimum nail spacing for lumber and glulams, the 2005 NDS Commentary provides the following information:

C11.1.5.6 Edge distance, end distance, and fastener spacing requirements have been consolidated across all diameters for dowel-type fasteners in NDS Table 11.5.1A through 11.5.1E. For diameters less than 1/4", specific requirements are not provided; however Table C11.1.5.6 may be used to establish nail placement recommendations. Designers should note that wood specie type, moisture content, and grain orientation will impact spacing effects between fasteners in a row.

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Table C11.1.5.6 Nail Minimum Spacing Tables

	Wood Side Members	
	Not Prebored	Prebored
Edge distance	2.5d	2.5d
End distance		
- tension load parallel to grain	15d	10d
- compression load parallel to grain	10d	5d
Spacing (pitch) between fasteners in a row		
- parallel to grain	15d	10d
- perpendicular to grain	10d	5d
Spacing (gage) between rows of fasteners		
- in-line	5d	3d
- staggered	2.5d	2.5d
	Steel Side Members	
	Not Prebored	Prebored
Edge distance	2.5d	2.5d
End distance		
- tension load parallel to grain	10d	5d
- compression load parallel to grain	5d	3d
Spacing (pitch) between fasteners in a row		
- parallel to grain	10d	5d
- perpendicular to grain	5d	2.5d
Spacing (gage) between rows of fasteners		
- in line	3d	2.5d
- staggered	2.5d	2.5d

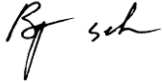
Furthermore, the wood shearwall and diaphragm design tables in the 2009 International Building Code (IBC) Chapter 23 or the 2008 Special Design Provisions for Wind and Seismic (SDPWS) also provide a reference point for the nail spacing (this is not necessarily the minimum nail spacing) that can be safely designed in timber structures because the framing members of wood shearwalls and diaphragms are typically lumber or glulams. For example, Table 2306.2.1(2) of the 2009 IBC lists a nail spacing of 2 inches for each of 2 rows of 10d common (3" x 0.148") nails when the framing members are at least nominal 3 inches (net 2-1/2 inches) wide. The narrow face of most glulam beams would be 3 inches or wider.

APA is a not-for-profit trade association and is recognized by the International Accreditation Service (IAS), a subsidiary of International Code Council (ICC), as an independent inspection agency as well as a testing laboratory. APA conducts

independent inspection on glulam products for APA members in accordance with Calvert's in-plant Manufacturing Standard and IAS Accreditation Criteria AC98.

Should there be any questions on this matter, please contact the undersigned.

Sincerely,

A handwritten signature in black ink, appearing to read "Borjen Yeh". The signature is written in a cursive style with a large initial "B" and a long, sweeping underline.

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