

## Fastener Spacing in Weyerhaeuser Engineered Lumber Products

This technical bulletin provides fastener spacing and placement information for Weyerhaeuser engineered lumber products. It is intended to supplement what is included in Weyerhaeuser's code evaluation reports and product literature. Specifically, the document provides recommended on-center spacing and minimum end distances for fasteners in continuous patterns. These guidelines do not apply to conditions including joist hangers and nailing of TJI® joists at bearing locations or other localized nailing applications. As with any connection in wood or wood-based material, avoiding unacceptable splitting often dictates fastener spacing and placement. The recommendations given in the following tables are based on preventing splitting that propagates from fastener to fastener within the connection. Splitting can be reduced by installing nails at slight angles and by using staggered or offset patterns.

The following tables provide general guidelines for fastener spacing as well as information relevant to determining the capacity of fastener connections. For additional information regarding TJI® joists, reference *Trus Joist® TJI® Joist Specifier's Guide (TJ-4000 / Canada: TJ-4500)*. For additional information regarding structural composite lumber, reference *Trus Joist® Beam, Header, and Column Specifier's Guide (TJ-9000 / Pacific Coast and Northwest: TJ-9020 / Canada-East: TJ-9500 / Canada-West: TJ-9505)* and *Trus Joist® Treated Parallam® Plus PSL Specifier's Guide (TJ-7102)*. For other applications, see *Attaching Fire Sprinkler Components to Weyerhaeuser Engineered Wood Products (TB-203)*. If closer on-center spacing patterns are required, please consult your Weyerhaeuser representative.

**TABLE 1: TJI® JOISTS, RIM JOISTS, AND BLOCKING PANELS<sup>[1][2][3][4][5]</sup>**

Nail			Nails into Wide Face of Flange <sup>[6]</sup>				Nails into Narrow Edge of Flange <sup>[7]</sup>			
			TJI®				TJI®			
Type	Length	Diameter	110 / 210 / 230		360 / 560 / 560D		110 / 210 / 230		360 / 560 / 560D	
			On-Center Spacing	Min. End Distance	On-Center Spacing	Min. End Distance	On-Center Spacing	Min. End Distance	On-Center Spacing	Min. End Distance
6d common	2"	0.113"	4"	2½"	3"	2"	6"	6"	3"	4"
8d box	2½"	0.113"	4"	2½"	3"	2"	6"	6"	3"	4"
8d common	2½"	0.131"	4"	2½"	3"	2"	6"	6"	6"	6"
8d N8 or NA11 <sup>[8]</sup>	1½"	0.131"	3"	2½"	3"	2"	6"	6"	6"	6"
10d box	3"	0.128"	4"	3"	3"	2"	6"	6"	5"	5"
12d box	3¼"	0.128"	4"	3"	3"	2"	6"	6"	5"	5"
10d common	3"	0.148"	4"	4½"	4"	3"	6"	6"	6"	6"
12d common	3¼"	0.148"	4"	4½"	4"	3"	6"	6"	6"	6"
10d N10 or NA9D <sup>[8]</sup>	1½"	0.148"	3"	4½"	3"	3"	6"	6"	6"	6"
16d box	3½"	0.135"	4"	4½"	4"	3"	6"	6"	6"	6"
16d sinker	3¼"	0.148"	4"	4½"	4"	3"	6"	6"	6"	6"
16d common	3½"	0.162"	6"	6"	6"	4"	Not Recommended			
Pneumatic	3", 3¼", 3½"	0.131"	4"	3"	3"	2"	6"	6"	6"	6"
Framing Angles: A34, A35, LTP4, LTP5, MP34, MPA1, MPA1F, MP4F			N/A				Not Recommended			

- [1] Fastener spacings in this table may be used for wood screws provided the lengths and root diameters are less than or equal to the nail sizes listed in the table. Always use screws intended for structural assembly of wood structures. Drywall screws should never be used since they tend to be brittle and may easily break.
- [2] Includes attachment of the bottom flange of TJI® rim joists and blocking panels to the wall plate below.
- [3] Recommended edge distance is ½" for TJI® 110 joists and ¾" for all other TJI® joist series (does not apply to diaphragm construction, see footnote 6).
- [4] Maximum spacing of nails should not exceed lateral stability requirements. See applicable literature.
- [5] For U.S. engineered diaphragm framing design information, see ICC-ES [ESR-1153](#) Table 2. For Canadian horizontal diaphragm design, see [TB-155](#).
- [6] One row of nails permitted (two at abutting panel edges) for diaphragms. Stagger nails when using 4" on-center spacing or less and maintain ¾" joist and panel edge distance. For other applications, multiple rows of fasteners are permitted if the rows are offset at least ½" and staggered.
- [7] One (1) row of nails only.
- [8] Nail spacing values shown are intended for use with only light-gauge steel straps. Multiple rows of nails must be offset at least ½" and staggered.

**TABLE 2: STRUCTURAL COMPOSITE LUMBER<sup>[1]</sup> (NOT FOR SHEAR WALL NAILING APPLICATIONS)**

Nail			Nails into Wide Face (Perpendicular to Strands)		Nails into Narrow Edge (Parallel to Strands)						Minimum End Distance
Type	Length	Diameter	Microllam® LVL, Parallam® PSL <sup>[2]</sup>	TimberStrand® LSL, TJ® Rim Board	Microllam® LVL	Parallam® PSL <sup>[2]</sup>	TimberStrand® LSL, TJ® Rim Board				
							1½"	1¼"	1½"	1¾" - 3½"	
On-Center Spacing			On-Center Spacing								
6d common	2"	0.113"	2"	2"	3"	3"	6"	4"	3"	3"	2½"
8d box	2½"	0.113"	2"	2"	3"	3"	6"	4"	3"	3"	2½"
8d common	2½"	0.131"	2"	2"	4"	4"	6"	4"	3"	3"	2¾"
8d N8 or NA11	1½"	0.131"	2"	2"	4"	4"	6"	4"	3"	3"	2¾"
10d box	3"	0.128"	2"	2"	4"	4"	6"	4"	3"	3"	2¾"
12d box	3¼"	0.128"	2"	2"	4"	4"	6"	4"	3"	3"	2¾"
10d common	3"	0.148"	3"	2½"	5"	4"	6"	4"	3"	3"	3"
12d common	3¼"	0.148"	3"	2½"	5"	4"	12" <sup>[3]</sup>	4"	3"	3"	3"
10d N10 or NA9D	1½"	0.148"	3"	2½"	5"	4"	6"	4"	3"	3"	3"
16d box	3½"	0.135"	3"	2½"	5"	4"	12" <sup>[3]</sup>	4"	3"	3"	2¾"
16d sinker	3¼"	0.148"	3"	2½"	5"	4"	12" <sup>[3]</sup>	4"	3"	3"	3"
16d common	3½"	0.162"	4"	3"	8" <sup>[3]</sup>	6"	16" <sup>[4]</sup>	6" <sup>[5]</sup>	6" <sup>[5]</sup>	6" <sup>[6]</sup>	3¼"
Pneumatic	3", 3¼", 3½"	0.131"	2"	2"	4"	4"	12" <sup>[5]</sup>	4"	3"	3"	2¾"
Proprietary Wood Screws <sup>[7][8]</sup>	Varies	0.250"	- <sup>[12]</sup>		- <sup>[9]</sup>	- <sup>[9][10]</sup>	N/A	- <sup>[9][11]</sup>			- <sup>[12]</sup>
Framing Angles: A34, A35, LTP4, LTP5, MP34, MPA1, MPA1F, MP4F			OK		N/A						2¾"

- [1] See **General Notes** on page 3.
- [2] For Treated Parallam® Plus PSL follow face nailing provisions of Parallam® PSL. For edge nailing, follow these provisions:
- o For nail diameters up to 0.113 in., a 3 in. on center nail spacing.
  - o For nail diameters up to 0.148 in., a 5 in. on center nail spacing.
  - o For nail diameters up to 0.162 in., a 6 in. on center nail spacing.
- [3] Can be reduced to 5" o.c. with maximum nail penetration of 1¼" into narrow edge (e.g., nails that connect sole plate above to blocking or rim).
- [4] Can be reduced to 8" o.c. with maximum nail penetration of 1¼" into narrow edge (e.g., nails that connect sole plate above to blocking or rim).
- [5] Can be reduced to 4" o.c. with maximum nail penetration of 1¼" into narrow edge (e.g., nails that connect sole plate above to blocking or rim).
- [6] Can be reduced to 3½" o.c. with maximum nail penetration of 1¼" into narrow edge (e.g., nails that connect sole plate above to blocking or rim).
- [7] Proprietary wood screws are Simpson Strong-Tie® SDS, SDW and Mitek® WS, WSWH structural wood screws.
- [8] 6" long Mitek® WS structural wood screws are not recommended for TimberStrand® LSL or Parallam® PSL.
- [9] Space proprietary wood screws at 6" o.c. minimum, into the narrow edge. For alternative spacing, reference Simpson Strong-Tie® *Fastening Systems Technical Guide 2019 (C-F-2019TECHSUP)*.
- [10] Two (2) staggered rows of proprietary wood screws are permitted in the narrow edge of Parallam® PSL for members 3½" thick. Three (3) staggered rows of proprietary wood screws are permitted in the narrow edge of Parallam® PSL for members greater than or equal to 5¼" thick. For multiple rows, edge distance may be designed according to NDS® Table 12.5.1c or be a minimum of 1" and spacing between staggered rows is a minimum of 1½".
- [11] One (1) row of proprietary wood screws is permitted in the narrow edge of TimberStrand® LSL for members 1¼", 1½", and 1¾" thick. Two (2) staggered rows of proprietary wood screws are permitted in the narrow edge of TimberStrand® LSL for members 3½" thick. For multiple rows, edge distance may be designed according to NDS® Table 12.5.1c or be a minimum of 1" and spacing between staggered rows is a minimum of 1½".
- [12] See screw manufacturer's recommendations for spacing and capacity of connections. End distances, edge distances, and capacity of the screws must be sufficient to minimize splitting.

**Fastener spacing not applicable for shear wall applications. See appropriate code report for grade specific TimberStrand® LSL nailing requirements.**

### General Notes for Table 2

- Fastener spacings in this table may be used for wood screws provided the lengths and root diameters are less than or equal to the nail sizes listed in the table. Always use screws intended for structural assembly of wood structures. Drywall screws should never be used since they tend to be brittle and may easily break.
- Maximum permissible rows are two (2) for 1¼" and 1½" thicknesses, three (3) for 1¾" thickness, and six (6) for thicknesses greater than or equal to 3½".
- To minimize splitting, member edge distance and spacing between rows shall be the greater of (2.5 x nail diameter) or ¾". Where multiple rows are used, fasteners in adjacent rows must be staggered and the rows must be equally spaced from the centerline of the narrow face axis.
- Slant sheathing nails to maintain minimum required structural composite lumber edge distance.
- To determine required design information for applications, such as TimberStrand® LSL shear walls, reference Table 4 below.

**TABLE 3: EQUIVALENT SPECIFIC GRAVITY FOR NAIL AND SCREW CONNECTIONS (NOT FOR SHEAR WALL DESIGN)<sup>[1]</sup>**

Product	Lateral		Withdrawal	
	Face	Edge	Face	Edge
Microllam® LVL, Parallam® PSL	0.50	0.50	0.50	0.50
1.3E TimberStrand® LSL	0.50	0.50 <sup>[2]</sup>	0.50	0.42
1.5E TimberStrand® LSL	0.50	0.50 <sup>[2]</sup>	0.50	0.42
1.55E TimberStrand® LSL	0.50	0.50 <sup>[2]</sup>	0.50	0.42
1.6E TimberStrand® LSL	0.50	0.50 <sup>[2]</sup>	0.50	0.42
1½" TJ® Rim Board	0.50	Not Evaluated	0.42	Not Evaluated
Treated Parallam® Plus PSL	See <a href="#">TJ-7102</a> for design adjustment factors			

[1] Specific gravity of 0.50 is equivalent to Douglas Fir-Larch; 0.42 is equivalent to Spruce-Pine-Fir.

[2] Specific gravity for proprietary wood screws installed into the edge of TimberStrand® LSL for lateral connections is 0.42.

**TABLE 4: MINIMUM NAIL SPACING AND EQUIVALENT SPECIFIC GRAVITY FOR DESIGNED SHEAR WALLS<sup>[1][2]</sup>**

Product <sup>[3]</sup>	Equivalent Specific Gravity (U.S.)	Species Factor (Canada)	Minimum O.C Spacing (in.)
1.3E TimberStrand® LSL	0.42	0.8	6
1.5E TimberStrand® LSL	0.42	0.8	2 <sup>[4]</sup> to 6
1.55E TimberStrand® LSL	0.42	0.8	2 <sup>[4]</sup> to 6
1.6E TimberStrand® LSL	0.50	1.0	2 <sup>[4]</sup> to 6
1½" TJ® Rim Board, 1½" 2.0E Microllam® LVL, Parallam® PSL, Treated Parallam® Plus PSL	Not Permitted		

[1] U.S. allowable shear values for nailed wood structural panel shear walls must be determined using Table 4.3A of the ASNI/AWC Special Design Provisions for Wind and Seismic (SDPWS) subject to the restrictions in this chart. See ICC-ES [ESR-1387](#) for further information.

[2] Canadian specified shear strength for nailed structural panel shear walls must be determined in accordance with Table 9.5.1.A of CSA O86 for the specified nail spacing and species factor in this chart. See CCMC [12627-R](#) for further information.

[3] When using StrandGuard® TimberStrand® LSL treated sill plates in dimension lumber shear wall assemblies, see [TJ-8100](#) for enhanced provisions.

[4] For Canadian applications, minimum spacing permitted is 3 in.

**TABLE 5: COMMON ADJUSTMENT FACTORS FOR CONNECTIONS<sup>[1]</sup>**

Property	United States			Canada		
	Notation	Lateral	Withdrawal	Notation	Lateral	Withdrawal
Duration of Load (Live Load)	$C_d$	1.00	1.00	$K_D$	1.00	1.00
Duration of Load (Snow Load)	$C_d$	1.15	1.15	$K_D$	1.00	1.00
Duration of Load (Construction Load)	$C_d$	1.25	1.25	$K_D$	1.15	1.15
Duration of Load (Wind/Seismic Load)	$C_d$	1.60	1.60	$K_D$	1.15	1.15
End Grain Factor	$C_{eg}$	0.67	N/A	$J_E$	0.67	N/A
Diaphragm Factor	$C_{di}$	1.10	N/A	$J_D$	1.30	N/A
Toe-nail Factor	$C_{tn}$	0.83	0.67	$J_A$	0.83	0.67

[1] Assumes non-treated wood, moisture content < 19%, and temperatures < 100° F.

***If you have any questions, please contact your Weyerhaeuser representative.***