Sole/Top Plate-to-Rim Fastening

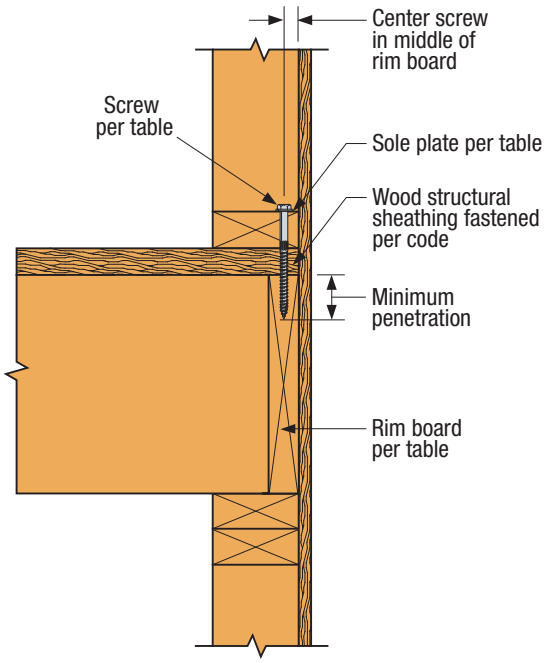
Strong-Drive® SDS HEAVY-DUTY CONNECTOR Screw

For more information, see p. 60, C-F-2019 Fastening Systems Catalog

SDS — Allowable Shear Values for Sole-to-Rim Connections

Size (in.)	Model No.	Sole Plate Nominal Thickness (in.)	Minimum Penetration into Rim Board (in.)	Reference Allowable Loads (lb.)							
				2x DFL/SP Rim Board		2x SPF/HF Rim Board		1¼" Min. LVL Rim Board		1¼" Min. LSL Rim Board	
				DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate
¼ x 4.5	SDS25412	2x	2	250	190	190	190	190	190	220	190
¼ x 5	SDS25500	2x	2	250	190	190	190	190	190	220	190
¼ x 6	SDS25600	2x, 3x, (2)-2x	2	250	190	190	190	190	190	220	190

1. Allowable loads are based on testing per ICC-ES AC233 and are limited to parallel-to-grain loading.
2. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration by the building code up to a C_D = 1.60.
3. Minimum spacing of the SDS for sawn lumber applications is 3" o.c., minimum end distance is 3", and minimum edge distance is ⅝".
4. Minimum spacing of the SDS for LVL and LSL applications is 6" o.c., minimum end distance is 6", and minimum edge distance is ⅝".
5. Wood structural panel up to 1⅛" thick is permitted between the sole plate and rim board provided it is fastened to the rim board per code and the minimum penetration of the screw into the rim board is met.
6. A double 2x sole/top plate is permitted provided it is independently fastened per the code and the minimum screw penetration per the table is met.
7. Minimum rim board height shall be 9¼" when using SDS screws for sole and top plate fastening.
8. Sole-to-rim loads can be achieved without a wall below.



Sole-to-Rim Board Assembly
(Other fasteners not shown for clarity)

Table 11.5.1A Edge Distance Requirements [1,2]

Direction of Loading	Minimum Edge Distance
Parallel to Grain:	
when $\ell/D \leq 6$	1.5D
when $\ell/D > 6$	1.5D or ½ the spacing between rows, whichever is greater
Perpendicular to Grain:[2]	
loaded edge	4D
unloaded edge	1.5D

1. The ℓ/D ratio used to determine the minimum edge distance shall be the lesser of:
   (a) length of fastener in wood main member/D = ℓ_m/D
   (b) total length of fastener in wood side member(s)/D = ℓ_s/D

Table C12.4-1 Nail Minimum Spacing Tables

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

Table 11.5.1B End Distance Requirements

Direction of Loading	End Distances	
	Minimum end distance for $C_\Delta = 0.5$	Minimum end distance for $C_\Delta = 1.0$
Perpendicular to Grain	2D	4D
Parallel to Grain, Compression: (fastener bearing away from member end)	2D	4D
Parallel to Grain, Tension: (fastener bearing toward member end)		
for softwoods	3.5D	7D
for hardwoods	2.5D	5D

For toe nails subject to lateral loads, the depth of penetration of the nail in the member holding the point may be taken as the vertically projected length of nail in the member as shown in Figure C12.3-1, or (see 12.1.3.2)

$$p_L = L_n cos30° - L_n/3 \qquad \text{(C12.3-3)}$$

where:

p_L = vertical projection of penetration of nail in main member, in.

L_n = length of nail, in.

For purposes of establishing the single shear lateral design value applicable to a toe nailed joint, the side member thickness shall be taken as the length of the nail in the side member (see Figure C12.3-1) or

$$t_s = L_n/3 \qquad \text{(C12.3-4)}$$

where:

t_s = effective side member thickness when toe-nailing is used, in.

Equation C12.3-4 only applies to nails driven at an angle of approximately 30° to the face of the member being attached and one-third the nail length from the end of that member. The effective side member thickness for nails driven at any angle to the face of the member being attached should not exceed the actual thickness of that member.

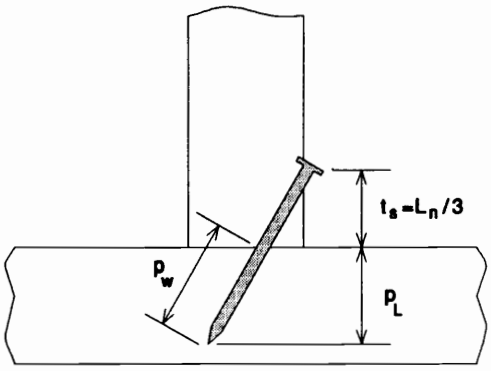


Figure C12.3-1 Effective penetration and side member thickness for toe nails subject to lateral loads.

12.4-PLACEMENT OF NAILS AND SPIKES

12.4.1-Edge Distance, End Distance, Spacing

Absence of splitting has been the performance criterion for placement of nails and spikes since the 1944 edition. Smaller nails can be placed closer to member ends and edges than larger nails as they are less likely to cause splitting. Where splitting can not be avoided, preboring of nail holes should be used (see 12.1.3.1).

In lieu of specific code requirements for end and edge distance for nails, Table C12.4-1 may be used to establish nailing patterns. Designers should note that specie type, moisture content and grain orientation will affect spacing (pitch) between fasteners in a row.

Table C12.4-1 Nail Minimum Spacing Tables

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

12.4.2-Multiple Nails or Spikes

Since the 1944 edition, the total design value for a connection made with more than one nail or spike has been determined as the sum of the allowable design values for the individual fasteners. In the 1992 edition, this summation provision is limited to only those nails or spikes in the joint which are of the same size and type (see Commentary for 7.2.2 and 7.1.1.1).